



Working Paper 2/2015

**Towards an understanding of the economy of Johannesburg:
Industrial nodes report**

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Abstract

The character of economic activity in Johannesburg has been shifting over time; away from primary and secondary sectors and towards services. Economic activity is very unevenly spread across the city and not well aligned with areas where the majority of the population lives. There is a need to increase competitive local production as a basis for exports, jobs, and sustainable services growth. This research, which forms part of a project commissioned by the City of Johannesburg, is aimed at better understanding the nature of economic activity in industrial areas of Johannesburg and the challenges being faced by firms in these areas.

A survey of firms in two industrial areas of Johannesburg was conducted, which generated data on firm performance and competitiveness, challenges faced, the advantages and disadvantages of the area from a business perspective, and areas where intervention by the City would be most fruitful. Finally, in order to gather more detailed information on firm experiences and to probe into some of the responses given to the survey in more depth, 10 firm interviews were conducted in each area.

This working paper presents the findings of the firm survey and interviews and provides insight into the nature of economic activity and the difficulties currently being faced by firms operating in industrial areas in Johannesburg. It seems that firms are facing a broad range of challenges and economic conditions are generally not favourable. A major concern for firms in both areas is the poor quality of infrastructure. The paper goes on to discuss policy interventions which could be effective in stimulating greater economic activity and employment creation in Johannesburg, focussing particularly on areas where the City can influence outcomes and encourage agglomeration economies which can improve efficiency and lower firms' costs.

JEL classification O14, O30 and O41

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1 Introduction

The Department of Economic Development (DED) at the City of Johannesburg (The City) is concerned with economic development and transformation in Johannesburg. The City accounts for 17% of South Africa's economic output and is the leading metro for most of the country's key sectors (City of Johannesburg Economic Strategy Roadmap, 2014). However, the character of economic activity in Johannesburg has been shifting over time; away from primary and secondary sectors and towards services. Economic activity is very unevenly spread across the city and not well aligned with areas where the majority of the population lives (City of Johannesburg Economic Strategy Roadmap, 2014). Furthermore, the challenges of poverty, unemployment and inequality are acute. The City recognizes the need to increase competitive local production as a basis for exports, jobs, and sustainable services growth.

The City has appointed the Centre for Competition, Regulation and Economic Development (CCRED) to conduct research to provide a deeper understanding of the economy of Johannesburg and the ways in which City can best use the tools at its disposal to drive the city towards an inclusive, job-intensive, resilient and competitive economy.

It is well recognised that the purpose of local economic development is to build up the economic capacity of an area. It is a process by which public, private sector and not for profit organisations work collectively to create better conditions for economic growth and employment generation. Cluster development is one of the channels that local economic development initiatives can use to encourage and support inter-firm collaboration, institutional development and support in targeted industrial sectors. Johannesburg already has a number of industrial nodes that offer economic development potential, however, there is much to be understood about what is required to improve economic development activity in these areas. A better understanding of these areas will allow the city to have a targeted approach to interventions and leverage resources in the direction of greatest potential return.

A focus on the organisation of production underpins frameworks that explain the dynamic of local economic development and the collective development of company competencies at the local level. This approach highlights the gains from collective learning in an evolutionary framework, with informal networks, common understanding, and trust all enabling the realisation of collective gains. The 'learning' of companies in developing production capabilities and research and development (R&D) activities is an area in which collective action by government and companies has an important role to play. Such action can result in institutions which provide services and training, so enabling positive externality effects (or 'spill-overs') to be built on. For example, there may be common elements in the development of a process technology by two companies in different sectors. Investment in training by companies contributes to a pool of skilled labour upon which all may draw.

There are strong collective benefits (positive externalities) from developing a pool of skilled labour and facilities including testing and research facilities for design and product development. These all mean cumulative causation at work in patterns of growth and decline. These factors help explain why, despite international trends towards liberalisation and increased international flows of goods and capital, industrial activity is more and more concentrated in local regions or districts (Helmsing, 2001). Different conceptual frameworks exist to explain these phenomenon and their implications. The 'new economic geography' associated with Krugman emphasises externalities, such as those associated with labour markets and skills development, specialist inputs required by companies, and technology spill-overs (see, for example, Krugman, 1998a and b). Since companies locate close to markets, specialisation in a particular location can be a result of historical accident and can persist after

the initial demand stimulus has receded in significance. This further implies that purposeful action is required to develop new industrial districts, and that the company groupings will need to get to a scale where there is division of labour within the cluster (Helmsing, 2001). The realisation of agglomeration effects associated with externalities also implies the need for co-operation between companies.

This role for the public sector is also highlighted by Best (2001) as one of the important features of developing production systems and more dynamic business models. International experience in the development of industrial districts and local industrial clusters demonstrates the importance of the public sector in creating appropriate institutions (see, for example, Best, 2001; Sheehan & Grewal, 2000; and Park, 2000). Successful industrial clusters and districts are often underpinned by the coming together of different factors including basic conditions such as working public infrastructure.

Drawing on these frameworks, industrial policy can be approached through understanding company production capabilities and performance, company strategies and decisions (e.g. in relation to training), the nature of inter-company relationships, and the role of government. In this approach, we recognise the potential for positive externality effects and spill-overs, which drive processes of cumulative causation in the returns to companies from location decisions. Also, the orientation of companies and their relationships with government are influenced by the historical development of capitalism in a country (Chandler et al., 1997 and 1998).

The role of government in fostering clusters is discussed extensively in literature and there has been substantial experience in South Africa which provides learnings (see Morris et al. 2005 for review of literature; Gwynne-Evans, 2014 for cluster experience in Western Cape). Though there is debate on the extent of government's involvement in fostering clusters, there is agreement on the importance of its role. Fundamentally, there is a critical need for a lead to be taken in supporting programmes with collective gains which cannot be reaped by any individual firm, and for the catalytic steps needed to organise the clusters. There may be heavy government involvement in the initial set up stage and government can then withdraw slowly during the operating and sustaining phase. Local government (at the Metro and Provincial level) has been most effective in championing this as they are close to the groups of firms in their area and are responsive to their needs. For example, the Western Cape has supported clusters through 'special purpose vehicles' to ensure the administrative and organisation core is provided. Interestingly, the microeconomic support programmes in this province have been built and adapted under successive administrations.

As part of the scope of the research, we map out the economic activity in Aeroton and Industria West. The aim of this area of work is to collect and analyse primary data on patterns of economic development and performance at the firm level, to understand constraints to entry, growth, and employment creation.

In Section 2 of the report we discuss the approach and methodology for the study and Section 3 profiles the three relevant nodes. Section 4 describes the firm survey including the methodology used, results and analysis. Section 5 presents the analysis of the firm interviews. Finally, Section 6 provides conclusions and recommendations and suggests a possible way forward for the City.

2 Approach and methodology

The study involves a firm level survey and in-depth firm interviews to map economic activity in 3 industrial nodes - Industria West, Aeroton and Wynberg - understand firm performance and locational decisions and key challenges that the city can address. Aeroton, Industria West and Wynberg are the pilot areas for the research and a discussion on how the areas were chosen follows in section 2.1. The survey was sent to all firms in Industria West and Aeroton, while the in-depth Interviews were conducted with 10 firms in Aeroton and Industria West and 5 firms in Wynberg. Wynberg was not surveyed. The purpose of the interviews was initially to get a sense of the issues in the area to enable better calibration of the survey, however, the interviews also gave more detailed responses to questions and in some instances firms sent follow up information as further inputs into the study.

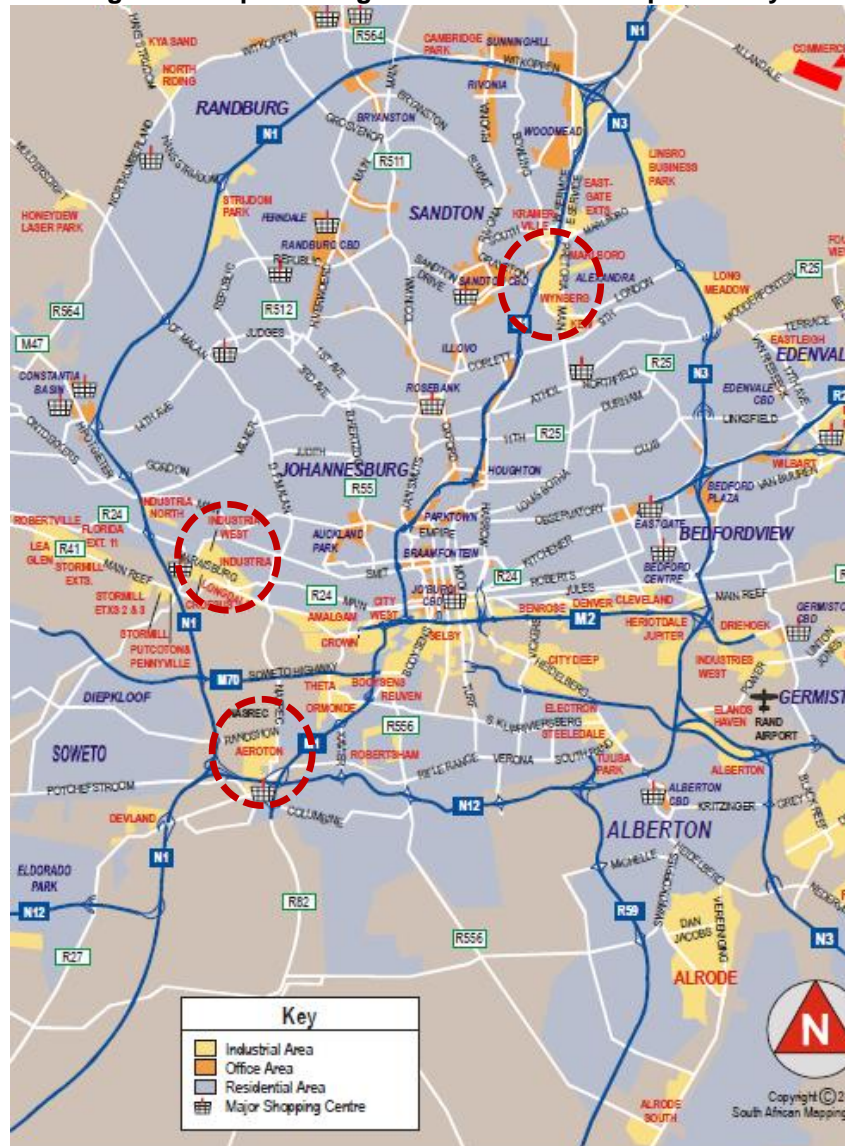
There are 73 firms in Industria West and 49 firms in Aeroton. In Industria West the firms were identified through a street-by-street field investigation. This includes any informal or unregistered activity. In Aeroton the firms were identified using google maps and verified by street by street investigations. Once firms were identified, 10 firms were selected such that the interviews would cover firms in different sectors and of different sizes.

2.1 Choice of industrial hubs for pilot study

Johannesburg's main industrial areas are highlighted in yellow on the map below with the areas chosen for the pilot study circled in red. The City selected three areas based on the following:

- The concentration of industrial activity
- Contribution to gross value added in labour-intensive industrial activities
- The proximity to public transport routes ('Corridors of Freedom')
- Ability to aid understanding of under-researched areas

Figure 1: Map showing areas chosen for the pilot study



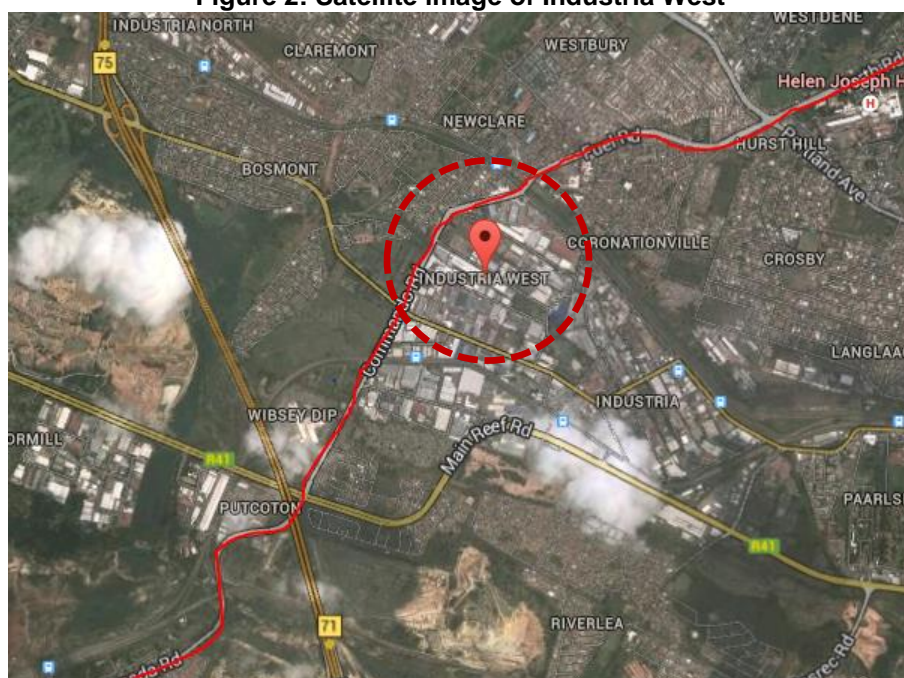
Source: Authors' adaptation

Each of the areas chosen is discussed in turn below.

Industria West

The map below illustrates the concentration of industrial activity in Industria West, with the city's planned Corridor of Freedom highlighted in red.

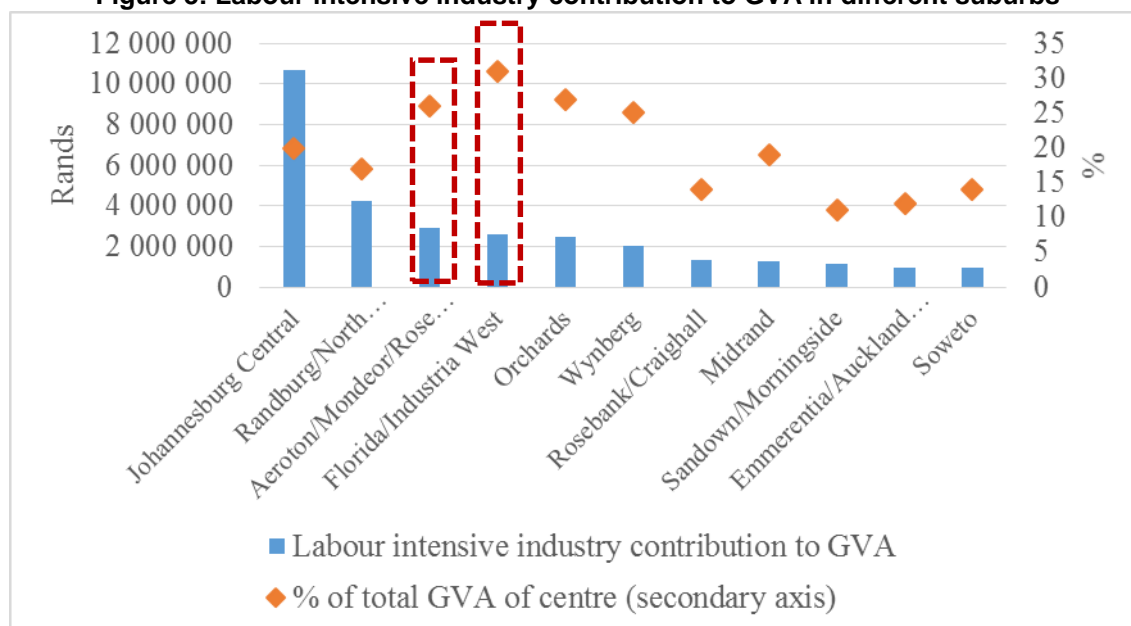
Figure 2: Satellite image of Industria West



Source: google maps

As illustrated in the figure below, Industria West has one of the largest contributions of labour intensive industry to Gross Value Added (GVA) in Johannesburg in absolute terms, following only Johannesburg CBD, Randburg and Aeroton. Furthermore, Industria West has the highest contribution of labour intensive industry as a proportion of total GVA (31%). Similarly, Industria West has one of the highest contributions of high-value manufacturing to GVA (13%), second only to Wynberg (City of Johannesburg, 2010). For this reason, it is a useful pilot area in which to get a sense of the challenges being faced by labour intensive industry and particularly by manufacturing industry.

Figure 3: Labour intensive industry contribution to GVA in different suburbs



Source: City of Johannesburg Growth Management Strategy: Growth Trends and Development Indicators Report 2010/2011.

In addition, as illustrated above, Industria West is adjacent to one of The City's Corridors of Freedom which connects Soweto to Auckland Park. It is also therefore a good pilot area in which to get a sense of the types of industrial activity taking place around the Corridors, as well as to better understand the way that industrial nodes interact with transport corridors and link up to other parts of the city.

Aeroton

The map below illustrates the concentration of industrial activity in Aeroton.

Figure 4: Satellite image of Aeroton



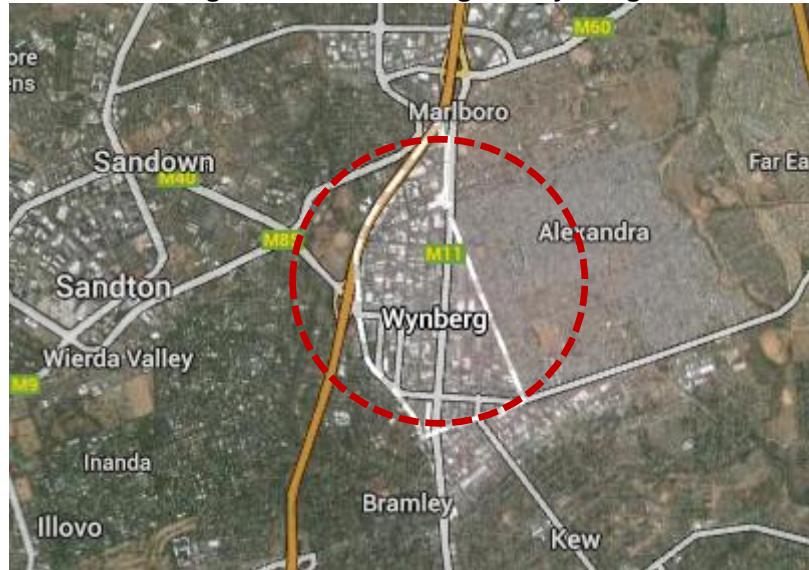
Source: Google Maps

As is shown in the graph above, Aeroton is also a key area of the city in terms of the contribution of labour intensive industry to GVA. It performs slightly better than Industria West in terms of absolute contribution, and slightly worse in terms of the proportion of GVA. It is also in the top 5 areas in terms of the contribution of high value manufacturing to GVA.

Wynberg

Wynberg is also an important industrial area of the city and, as illustrated in the Figure below, is adjacent to the Corridor of Freedom running from Sandton past Alexandra, down Louis Botha into central Johannesburg.

Figure 5: Satellite image of Wynberg



Source: Google Maps

Due to time and resource constraints, the full survey could not be implemented in Wynberg, however, five in-depth interviews were carried out in order to get a sense of the challenges facing businesses in the area.

3 Profiles of the nodes

3.1 Aeroton

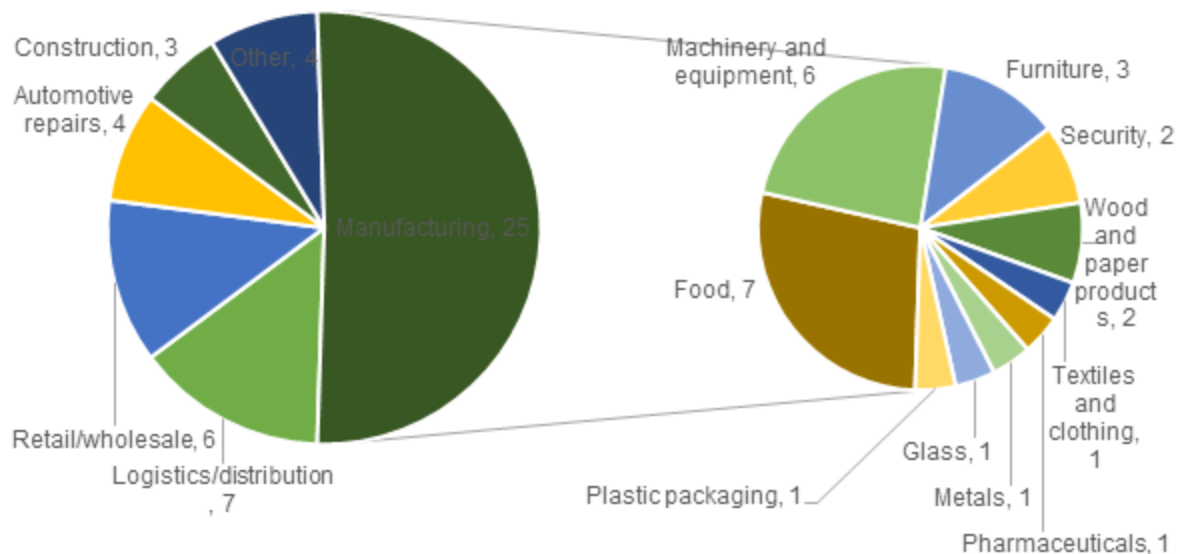
Aeroton is an industrial area located south of the Johannesburg CBD. It is bound by Nasrec Road to the east, Rand Show Road to the north, Aerodrome Road to the west and Old Potch Road to the south. The area is well connected to the rest of Gauteng as it is situated near a highway network formed by two branches of the N1 and the Southern Bypass (N12). The accessibility for firms is therefore excellent in terms of accessing inputs and customers. The area is also well located near the large, under-employed population base in Soweto. Most firms in the area pull the majority of their labour force from Soweto. From a public transport perspective, however, Aeroton is not so well connected, as will be discussed later in this document.

Aeroton is also located adjacent to undeveloped property which may be suitable for expansion. If developed with sufficient room to expand, this area could become more competitive for attracting medium-sized firms that need good highway access and relatively low-cost land over the long-term.

The main land use in the area is labour-intensive industry and there are a wide variety of industrial activities taking place. There are a number of manufacturing firms present and the products being manufactured include food, packaging, pharmaceuticals, mining equipment, glass, bricks and greetings cards. Another major area of activity is in distribution where there are firms distributing imported and locally manufactured products such as forklifts, trucks and construction equipment. There are also logistics and transport companies in the area. Finally, there are a small number of firms in the construction sector focussed on waterproofing and painting and four which conduct automotive repairs. This is illustrated in the graph below.

There are also a range of sizes of firms from very small enterprises with less than 10 employees to large manufacturing plants with 500 or more employees. The largest firms in the area are Adcock Ingram Critical Care and Sasko, who manufacture sterile fluids and bags and bread respectively.

Figure 6: Distribution of 49 firms identified in Aeroton



Source: Authors' compilation

The interesting insight drawn from the scoping exercise is that contrary to the City of Joburg's Industrial node profile of Aeroton as focusing on warehouse and distribution, the most

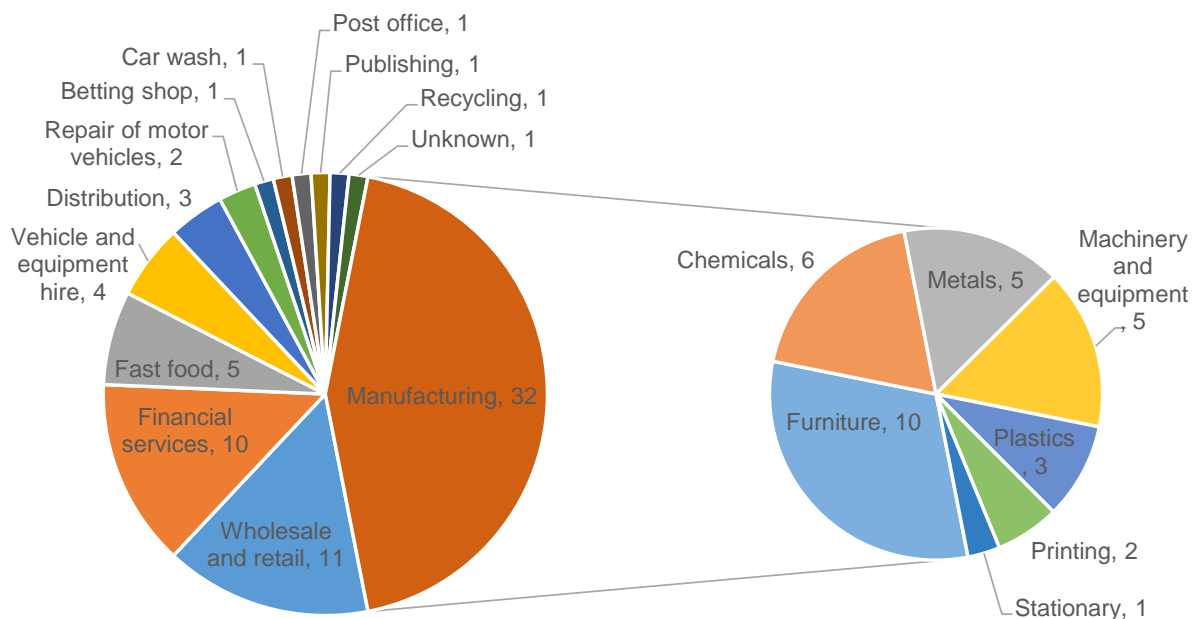
dominant activity in the area is manufacturing. Given Aeroton's good location and opportunities for growth due to relatively cheap rental, proximity to labour and land availability there is an expectation that the area should be attracting firms to locate in the area. However, there have been very few firms moving into the area and the land adjacent to it still remains empty. In the following sections we try to unpack the advantages and disadvantages of locating in Aeroton by evaluating the experience of the firms that are currently located in Aeroton.

3.2 Industria West

Industria West is a well-established industrial area located west of the Johannesburg CBD. It is bound by Commando Road, Albertina Sisulu Road and Nobel Street. The area is well served by public transport with access to the Rea Vaya, Metrorail and bus services nearby.

The main activity taking place in the area is again manufacturing. The main products being manufactured are furniture, chemicals, machinery and equipment and metal products. There are also a small number of stationary, packaging and foam products firms. There are several financial services firms in the area as well as a number of wholesale and retail firms. The remainder of the firms are engaged in printing and publishing, transport, motor repairs and recycling. This is illustrated in the graph below.

Figure 7: Distribution of 73 firms identified in Industria West



Source: Authors' compilation

3.3 Wynberg

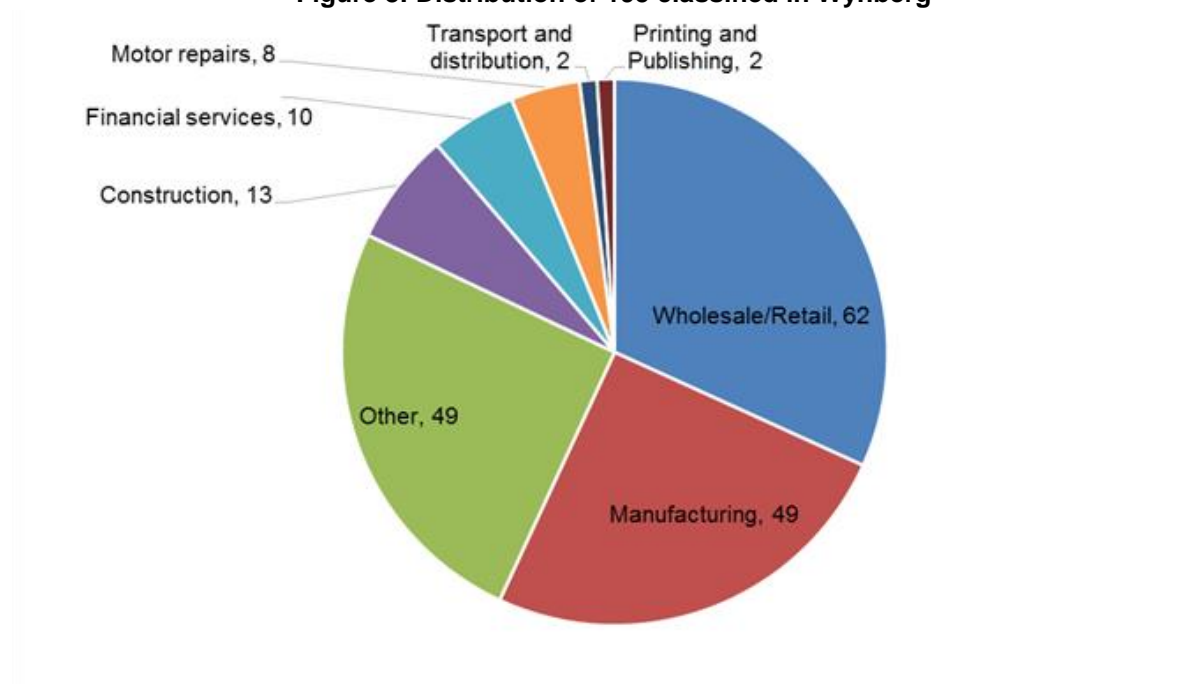
Wynberg is situated between the Alexandra Township and the Sandton business centre. It is well located in terms of access to the highways and proximity a large labour force in Alexandra. It is just off the M1 highway with access to the N3 via Marlboro drive. The main road running through the industrial node is Louis Botha Avenue.¹

¹ http://www.joburg-archive.co.za/2010/pdfs/sdf/final/annc_wynberg_marlboro_kew.pdf

The area is approximately 212 hectares. The Wynberg Improvement District (to be discussed below) has a directory of 33 firms² which is substantially lower than the number of firms in the area as recorded in the Lightstone Business database which lists 385 firms.

The area is dominated by wholesale and retail, labour-intensive light industry including manufacturing, distribution and services. The common manufacturing firms are shop fitters, air conditioners, packaging, pharmaceuticals, mining equipment, glass & aluminium products, metal products.

Figure 8: Distribution of 195 classified in Wynberg



Source: Lightstone Business Database

Unlike Aeroton and Industria West, Wynberg has a business association, the Wynberg Improvement District.

4 Firm survey

The aim of the survey was to collect and analyse primary data on patterns of economic development and performance at the firm level and to understand constraints to entry, growth, and employment creation. This will assist the City to design interventions that will more effectively stimulate dynamism and growth in the Gauteng City's economy.

The required interventions will vary depending on sector and area. Different sectors require different enabling conditions and, therefore, different interventions. Activities that work well in one sector/area may not be appropriate in another due to, for example, differences in land use patterns, and access to key inputs and transport links.

The results described in this report are the findings from a pilot study that was conducted in two specifically selected areas. As discussed above, the two areas selected were Industria West and Aeroton.

² [Wynberg Improvement District Directory](#)

The pilot study served two purposes. First it served to test the methodology, and second, it generated data that could be used (in congruence with other available data) to inform policy-making and decision-making in the City, as it pertains to the development and management of the city's industrial areas.

4.1 Survey methodology

4.1.1 Identifying firms

The boundaries of the survey target areas coincide with the formal boundaries of the two chosen suburbs. Once the areas to be targeted for the firm survey were chosen, it was necessary to identify and gather contact details for all the firms in the area in order to create a sample frame. Firms were identified through a street-by-street scoping activity/observation procedure which gathered information on the name, address and contact details of each firm. Where possible, the main activity of the firm was also captured by the field workers. Three firms refused to provide their details to the field workers and in these instances the field workers were only able to note down the name and any details of the firms displayed on the street.

A total of 122 firms were identified in the two areas, 49 in Aeroton and 73 in Industria West. Given the small sample size in the two areas, the decision was made not to sample the population of firms but rather to contact all the identified organisations with the exception of bank branches, fast food outlets, a betting shop and a post office.

4.1.2 Questionnaire design

The questionnaire was designed to gather information on a number of themes. The full list of survey questions is included in Annexure 1 to this report, but the key themes of the survey are described here. Firstly, the survey aimed to gather basic background information on firms such as their main activities, size (in terms of sales revenue), number of employees and tenure at the current site. The next category of questions was around understanding firms' operations and performance over the past two to three years. This included questions on operating shift patterns, location of customers, age of equipment, sales growth, investment and challenges faced by firms. Thirdly, a series of questions were asked to solicit respondent's perceptions of the advantages and disadvantages of locating in Aeroton or Industria West. This was followed by questions seeking perceptions on the quality of local infrastructure available in the area. Specific indicators for electricity, water and roads were used. The fifth section sought to measure the availability of skills and training. The penultimate section of the survey questionnaire included indicators for research and development and sought to measure the types, and availability of, public transport in the area. Finally, firms were asked about their experiences of interacting with the City and were encouraged to list any interventions that they felt the City should make to improve the competitiveness of their business and to encourage growth in the area.

Aside from the final questions which were more open ended, the survey was made up of multiple choice questions. Efforts were made to provide a realistic range of possible responses and a series of pilot interviews with firms in the two areas were held in order to inform the questionnaire design. Options were offered for firms to answer "other" or "not applicable" wherever relevant. Where they entered "other" they were required to specify an answer. Where relevant, questions were preceded by a qualifying question in order not to lead responses.

The survey questionnaire was piloted in an area outside the study area by experienced fieldworkers and refinements were made to the instruments as a result. In total, the survey was made up of 45 questions. The questionnaire was administered in English only which is a limitation of the study.

4.1.3 Data collection

An email was sent to each firm introducing the survey and containing a link to an online survey questionnaire which firms were requested to complete. The survey generally took around 15-20 minutes to complete. Each email generated a unique survey link such that when the response was collected, the researchers were able to see which individual had completed the survey.

An email was sent to 44 out of the 49 firms in Aeroton. For the remaining 5 firms, a contact number and/or email address could not be found. In Industria West, 47 firms were emailed out of 55 eligible firms (as noted above, bank branches, fast food outlets, a betting shop and a post office were excluded). Of the remaining 8 firms 5 indicated that they were not prepared to participate in the study and contact details could not be found for 3 firms. Furthermore, 2 emails were not able to be delivered to firms in Industria West. Thus in total, the survey was successfully sent to 89 firms.

The first round of emails were sent between 6 and 10 October 2014. Following the emails sent to firms, researchers called each firm to explain the survey and check that the emails had been received. Where necessary, emails were resent, either to the same email address or to a different employee within the company. Reminder emails were sent and follow-up phone calls were made at regular intervals for four weeks. Where firms indicated that they would prefer to meet with a researcher to complete the questionnaire, field visits were conducted.

4.1.4 Possible sources of bias in the survey data

Whilst efforts were made to identify every firm in Aeroton and Industria West and to ensure they were given the opportunity to participate in the survey, there are some potential sources of bias in the data, largely arising from self-selection by firms. As the survey was administered by email and online, this could have prevented the participation of smaller businesses or less IT literate firm owners. However, the vast majority of firms identified were able to provide an email address, suggesting that they were comfortable with the approach. Only two of the firms contacted indicated that they had no email address.

The complexity of the questions in the survey was deliberately minimised and, as discussed above, most of the questions were in the form of multiple choice. This was intended to increase the ease of responding to the survey and therefore reduce the chance of people giving up half way through if they were confused by the questions. In order to ensure that the respondents completed the survey truthfully, sensitive questions were structured in broad categories. Categories ensure that the data was collected without influencing the respondent to overstate or understate their response.

Nevertheless, there were a number of incomplete responses, ranging from respondents who had missed one or two questions, to those who had started the questionnaire but given up after only a small number of questions. The table below indicates how many responses were received for each survey question. In the analysis which follows, the number of respondents to each question is also clearly specified.

Following data collection, the subsequent step was to clean the data. This was done by verifying if the firms had selected the appropriate activity according to the SIC codes based on the description they had provided in response to Question 2 which asked each firm to describe the key products and services that the company produces/provides. Additionally, Lightstone data was used to verify some of the information provided by firms as an independent check.³

Table 1: Number of responses per survey question

1	46	11	35	21	30	31	34	41	33
2	43	12	36	22	32	32	30	42	8
3	45	13	36	23	32	33	35	43	7
4	38	14	35	24	32	34	34	44	30
5	40	15	35	25	34	35	34	45	23
6	36	16	36	26	5	36	33		
7	38	17	30	27	35	37	13		
8	9	18	36	28	34	38	34		
9	36	19	31	29	34	39	33		
10	14	20	37	30	22	40	33		

Source: survey responses

Self-selection bias on the part of firms is also possible which may result in more firms who are unhappy with the current state of infrastructure in the area and services provided by the City choosing to fill in the survey than those who are satisfied with the area and services. This seems unlikely, however, since the researchers experienced resistance from a number of firms who were unhappy with the services provided in their area and cynical regarding the ability and appetite of the City to work to improve the situation. Such firms often felt that the survey was a waste of their time from which no benefit would be derived. Thus there is no reason to believe that unhappy firms would be more or less predisposed to complete the survey than satisfied firms.

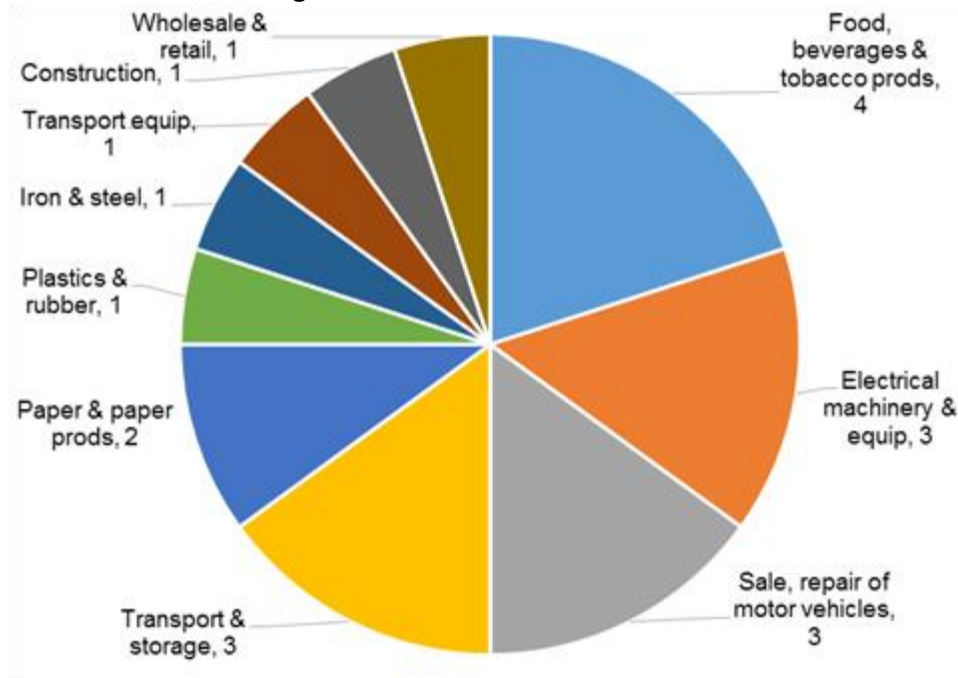
4.2 Overview of respondents

The survey was successfully sent to 89 firms of which 47 firms responded, resulting in a response rate of 53%. Of the 47 participating firms, 20 were from Aeroton, while 27 firms were from Industria West which shows that 42% and 58% of the responses are from Aeroton and Industria West respectively. These firms' activities were distributed among transport and storage, sale, repair and maintenance of motor vehicles, wholesale and retail, construction and manufacturing. The greatest proportion of activity among participating firms is derived from manufacturing, with 32 firms being in this category. Manufacturing is a rather broad category and figures below elaborate on which sectors are present in each area.

The responses from Aeroton report that most of the economic activity is in the manufacture of food, beverages, and tobacco products and transport and storage and plastics and rubber where they have 4, 3 and 3 firms respectively.

³ Lightstone Business database. However, we note that the database has aggregated sic code descriptions of firm activities and a substantial number of firm activities are not classified.

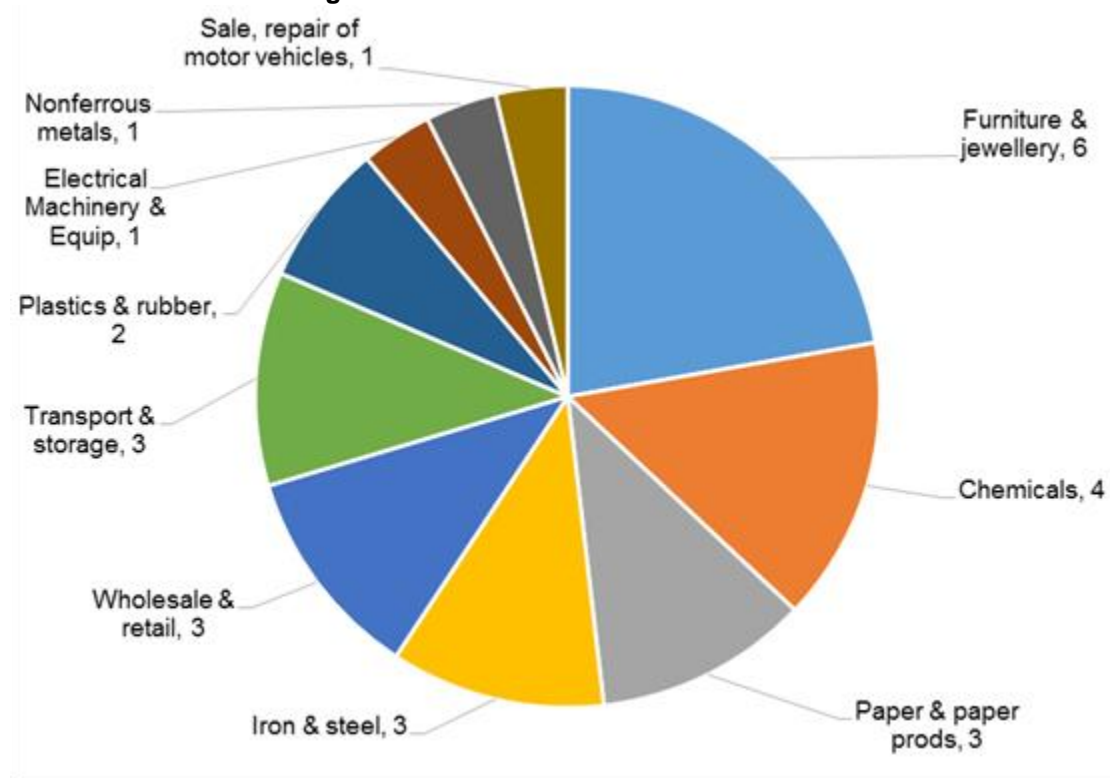
Figure 9: Aeroton Firm Distribution



Source: survey data

On the other hand, the respondents from Industria West are involved in quite different activities. The Figure below illustrates that the focus is on furniture and jewellery, chemicals, iron and steel, paper and paper products, plastics and rubber and wholesale and retail where there are 6, 4, 3, 3, 3 and 3 firms respectively.

Figure 10: Industria West firm distribution

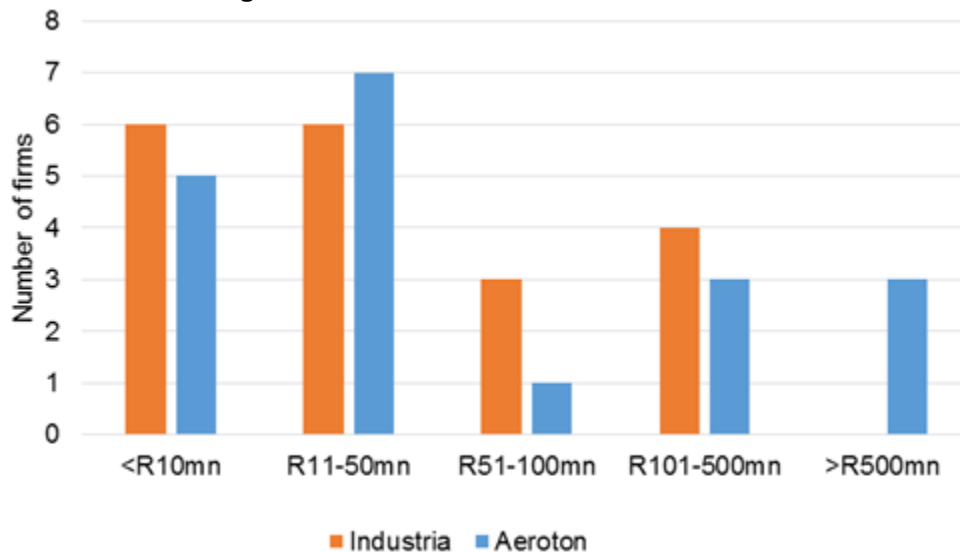


Source: survey data

The difference in the composition of firms in Aeroton and Industria will be important in drawing on the challenges that firms in the two areas face, and the likely recommendations.

In the survey the previous years' sales turnover were consulted in order to assess the size of the firms. 24 firms reported annual sales revenue of less than R50 million, which indicated that they fall into the category of micro to medium scale firms. The remaining 23 firms indicated that they earn more than R50 million, hence they are large firms. These are the thresholds stipulated by the National Small Business Amendment Act of 2003. Aeroton, however, tends to be comprised of larger firms compared to Industria West: Aeroton has twice as many firms that earn more than R100 million.

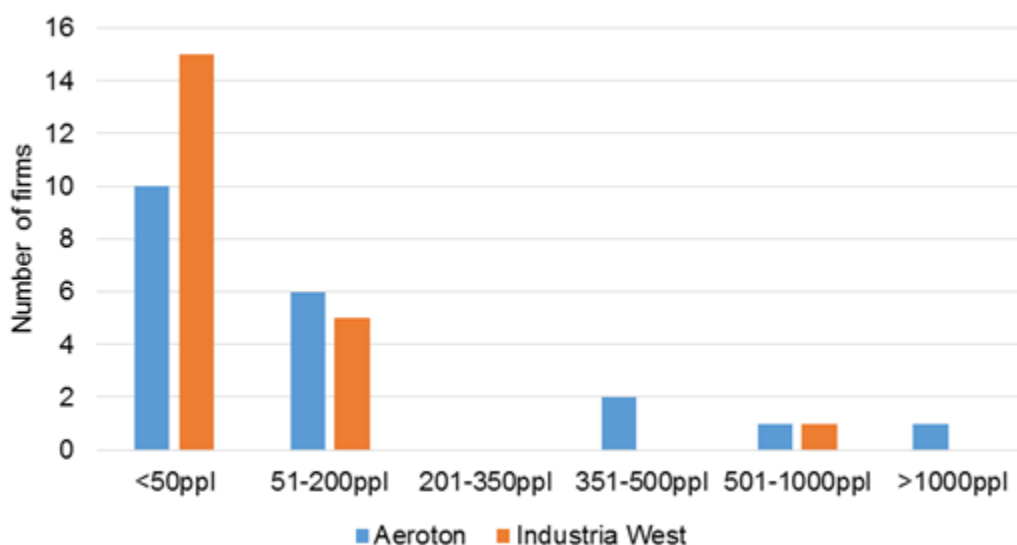
Figure 11: Total value of sales in 2013



Source: survey data

On the other hand according to the number of employees, most of respondents range from micro to medium scale firms. Out of 47 firms, 25 firms had 0-50 employees, while 10 had 51-200 employees. This shows that more than 74% of firms had less than 200 employees which indeed qualifies them as micro to medium scale firms. The remaining 5 firms had greater than 350 employees, with the exception of one firm which had more than 1000 employees. These figures are illustrated in Figure 5 below. This illustrates the importance of small and medium firms in both areas.

Figure 12: Employees at the current site (part-time and full-time)



Source: Survey data

4.3 Detailed survey results

4.3.1 Interpreting the survey results

Before discussing the survey results in detail, some comments on the interpretation of the data are required. As noted above, the survey was designed as a census of firms of firms in each area, and so all firms were surveyed rather than a sample of firms. This, combined with the dedicated resources directed at gathering responses resulted in a high response rate in terms of the proportion of firms in each area which responded to the survey. However, in terms of statistical confidence, the fact that the number of responses overall is still quite low in statistical terms means that the confidence intervals required to interpret the data are relatively wide. For example, 47 responses out of a population of 110 at a 95% confidence interval gives an 11% error rate. This means that if 60% of respondents said that they had less than 200 employees for example, the correct way to interpret this proportion is that we can say with 95% confidence that between 49% and 71% of firms in the two areas have less than 200 employees. The confidence intervals become still wider if cross tabulations are imposed on the data, as the number of respondents who fall into each category declines still further.

Of course, 95% confidence (the threshold typically used in statistical analysis) is setting quite a high bar and may be more than is required for these purposes. It may be that a 70% or 80% confidence interval is appropriate in looking at the views of firms in these areas. We take a pragmatic approach in the data analysis below, and rather than sticking rigidly to one threshold, rather explain in each case how the data can and should be interpreted and where caution should be applied. We have, however, refrained from breaking down the data into more than two or three categories in any cross-tabulation, particularly where the number of responses was low, as beyond this point any results become meaningless. All results reported should therefore be interpreted as holding only for the firms surveyed or, at the most, for the firms in Aeroton and Industria West. The results of the survey should not be applied more broadly to other areas in Johannesburg or Gauteng, and further research would be required in order to find out whether similar statements can be made for other areas.

A final point to note here is that technically if the number of responses is below 100 (as it is in this case), it is not correct to talk about percentages; fractions or proportions should be used instead. However, for ease of reference we use percentages in the report as it makes

comparison much easier and therefore this is a caveat which applies to the analysis throughout.

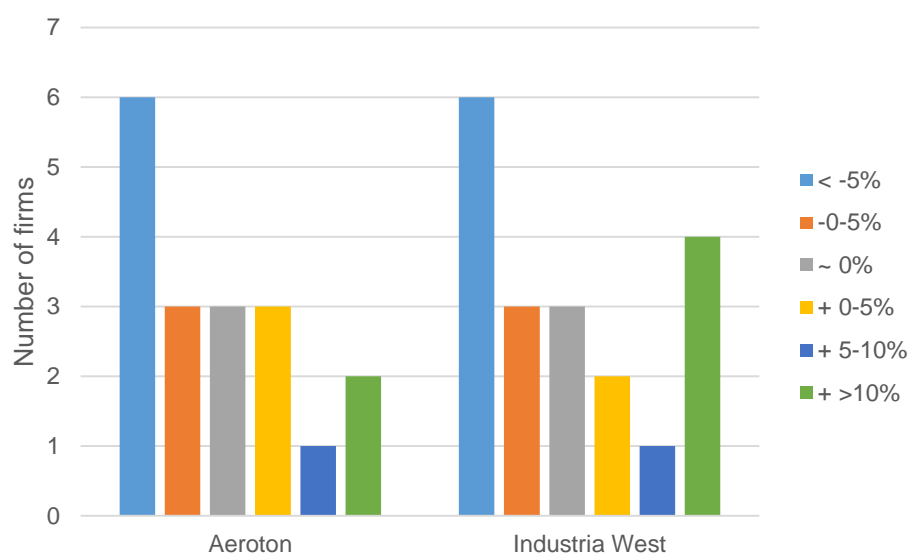
4.3.2 Company performance

Sales growth

Firms were asked to report whether their average annual sales over the past three years had increased (by 0-5%, 5-10% or 10%+), decreased (by 0-5% or 5%+) or stayed the same. 37 respondents answered the question, 18 from Aeroton and 19 from Industria West. The figure below illustrates the responses received. The majority of firms in both areas are not growing and an alarming proportions are shrinking by more than 5% per year in terms of sales volumes. One third of firms have seen their sales shrink by more than 5% per year on average for the past three years. Half of firms have seen their annual sales shrink on average for the past three years. Firms which are shrinking are likely to also be employing fewer people and are less likely to be able to make investments in developing new products or expanding capacity.

The responses for Aeroton and Industria West were very similar as illustrated below. The results correspond to the insights from the firm interviews, where the majority of the firms claimed to be facing difficult economic conditions and low levels of customer demand. However, two firms in Aeroton and four firms in Industria West reported growing at more than 10% per year on average for the past three years which an exceptionally good performance. Therefore, whilst the overall picture is quite negative, there are still some firms which have been able to grow strongly despite difficult circumstances.

Figure 13: Annual average growth in sales volumes, 2012 – 2014 (n=37)



Source: Survey data

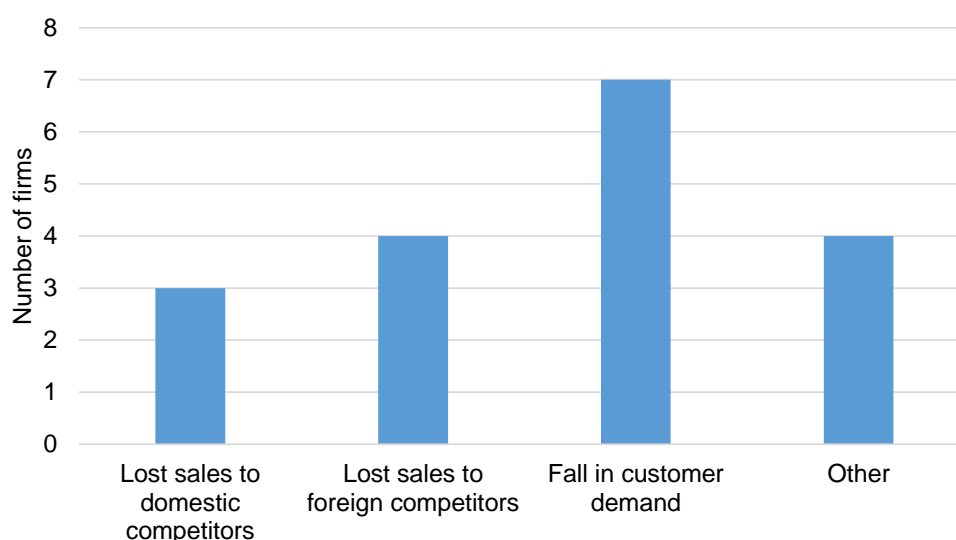
The table below reports firm growth cross-tabulated with whether firms are manufacturing or non-manufacturing firms. Interestingly, the responses in terms of growth were identical in terms of proportions for manufacturing and non-manufacturing firms. Thus when evaluating the null hypothesis that firm growth is independent of manufacturing, it was not possible to reject the null at the 5% level. There appears to be no relationship between whether firms are manufacturing and whether they are growing, based on the responses received. Two thirds of firms are not growing across both categories of firms.

Table 2: Manufacturing vs. growth

	Growing	Not growing	Total
Non-manufacturing	4	8	12
Manufacturing	9	16	24
Total	13	24	37
X ² P-value			0.8445

Source: survey data, own calculations

Those firms who reported declining sales were asked to explain the main reason for the decrease in sales. Most (seven out of the eighteen responses) answered that falling customer demand was the main reason for falling sales as illustrated below. This is in line with the firm interviews where a number of firms complained of poor economic conditions and a lack of customer demand. This is particularly in terms of domestic demand, and a number of interviewees noted that they have been expanding into regional markets in order to try to mitigate the impact of low demand from local customers.

Figure 14: Main reason for the decrease in sales (n=18)

Source: Survey data

The firms that answered “other” offered a variety of explanations for their poor performance. However, most cited general economic conditions, giving answers like “business outlook has gone down”, “political reasons”, “macro-economy, exchange rate”, “recession”, “Closure of companies, companies moving” and “market instability”. This presents further evidence that the economic conditions in the country and consequent low levels of customer demand are largely responsible for the observed poor performance of firms.

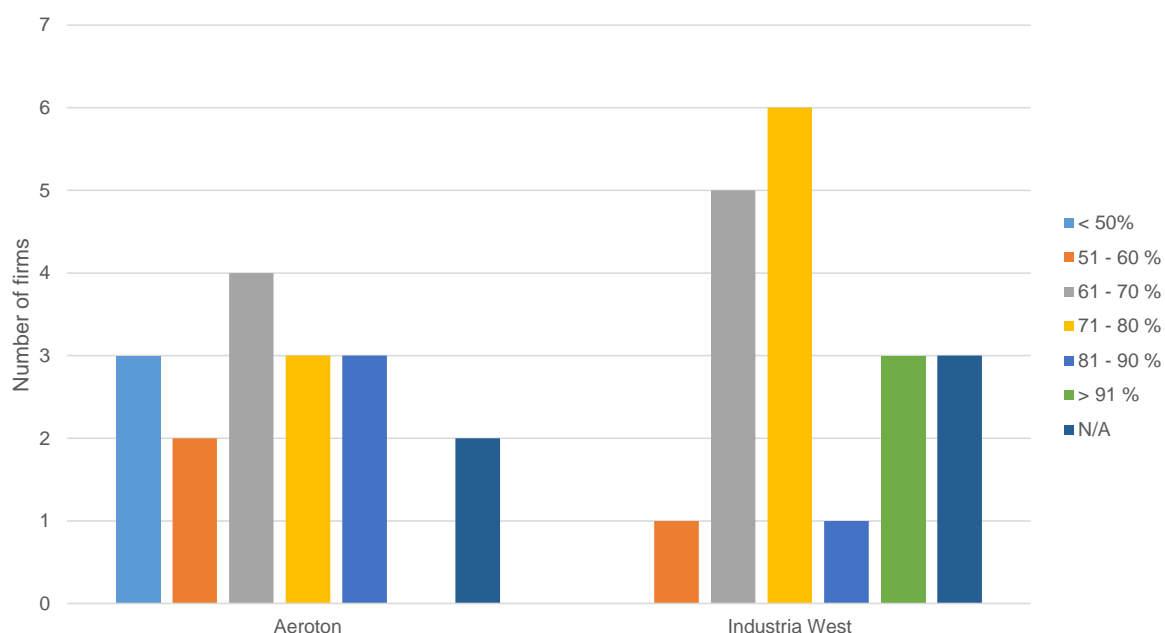
In addition, one firm mentioned an influx of Chinese-made products as the reason for its sales decline. Another cited a lack of productivity. Finally, one firm noted that a shortage of raw materials was to blame.

Capacity utilisation

Firms were asked to report their level of capacity utilisation relative to total installed capacity. There were 36 responses, 17 from Aeroton and 19 from Industria West. As illustrated in the figure below, in Aeroton more than 50% of respondents reported utilisation rates of under 70%, with three firms indicating that their utilisation rate was below 50%. In Industria West, however,

the majority had utilisation rates of over 70%, and no firms had utilisation rates of below 50%. Respondents from Aeroton thus appear to have lower rates of utilisation than those from Industria West.

Figure 15: capacity utilisation (n=36)



Source: Survey data

Low levels of capacity utilisation are what would be expected given the poor sales performance described above. The table below reports a cross-tabulation of capacity utilisation with whether firms are growing or not growing. The null hypothesis that capacity utilisation is independent of firm growth was rejected at the 1% level, suggesting that there is a relationship between growth and capacity utilisation, as would be expected. Firms that are not growing are more likely to have low capacity utilisation than firms that are growing and vice versa.

Table 3: Growth and capacity utilisation

	60% or less	60-80%	More than 80%	Total
Growing	1	3	6	10
Not growing	5	15	1	21
Total	6	18	7	31
			X ² P-value	0.000843

Source: survey data, own calculations

Shift patterns

39 firms answered the question on shift patterns, of which only nine firms do run shifts. Seven of these reported that they run two shifts per day and the other two reported that they run three shifts per day. The seven respondents who run two shifts per day all reported that the availability of public transport does affect their ability to run optimally, e.g. to optimise shift patterns. The two firms running three shifts per day on the other hand did not feel that the availability of transport affects their ability to run optimally. This suggests that the firms running three shifts have managed to find a solution to the problem of worker transport for late/early shifts, perhaps due to necessity. This ties in with the interview responses where firms reported having to organise their own transport for workers after hours in order to run three shifts. The

firms running two shifts may be doing so sub-optimally, due to the difficulty of getting workers to and from the plant for the early/late shift.

Main markets

Firms were asked to indicate what proportion of the company's sales (in %) from production at the site is sold to customers in Gauteng, South Africa including Gauteng and the rest of the world (i.e. exports). 35 firms responded to the question, but of these, 10 did not make sense since South African sales plus exports did not add up to 100%. The 10 responses were therefore excluded from the analysis. The reported proportions were then averaged in order to calculate an average proportion of sales to different markets across all firms. On average, firms supply 62% of their sales to Gauteng, 29% to the rest of South Africa and 10% to the rest of the world⁴.

Averages were then calculated for firms in Aeroton and Industria West separately, for manufacturing and non-manufacturing firms and for firms which have been growing and firms which have not been growing. These are reported in the table below. The number of firms which fell into both categories is indicated in the column on the far right.

Table 4: average proportion of sales to different markets

	Gauteng	Rest of SA	Exports	Number of firms
Total	62%	29%	10%	25
Aeroton	60%	31%	10%	11
Industria West	63%	27%	10%	14
Manufacturing	59%	29%	12%	16
Non-manufacturing	66%	28%	6%	9
Growing	61%	30%	9%	8
Not growing	59%	29%	11%	16

Source: survey data, own calculations

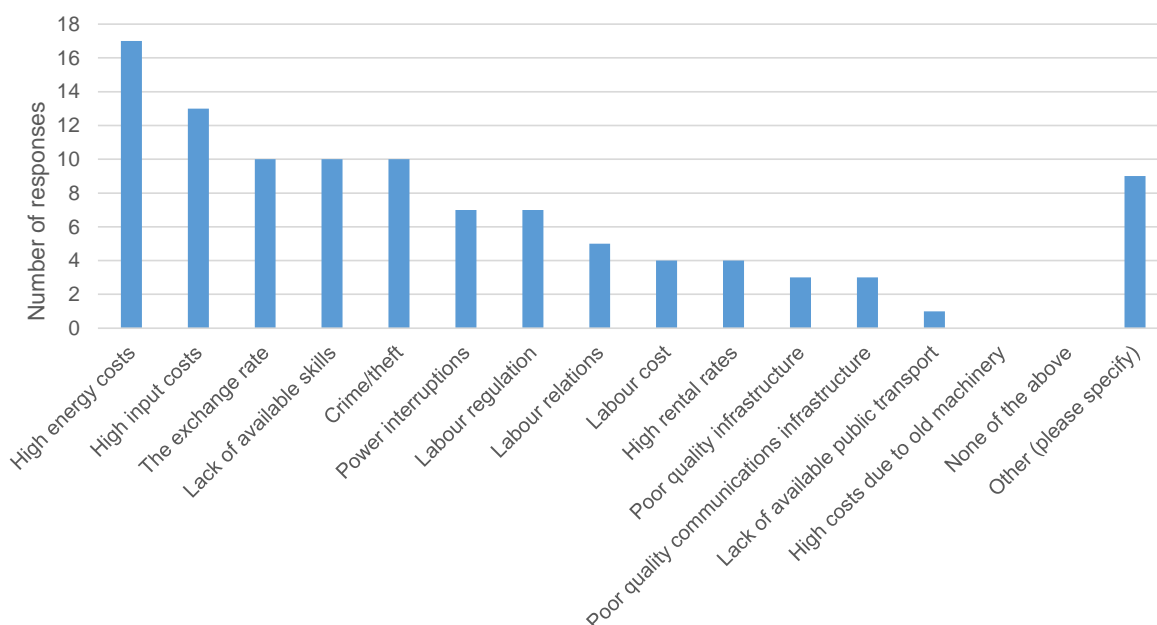
As illustrated in the table above, there was not a lot of variability in the proportion of sales that firms sell to customers in different regions depending on their characteristics. Firms in Industria West sell a slightly higher proportion of sales to customers in Gauteng (3%) than firms in Aeroton do. Firms that are not growing appear to export slightly more than firms that are growing which is counter to what was expressed in the interviews as will be discussed in more detail below. This is unlikely to be a significant difference given the small sample size, however. The biggest difference is observed between manufacturing and non-manufacturing firms where manufacturing firms export a much larger proportion of sales than non-manufacturing firms (around double).

Challenges faced

Respondents were asked to choose up to three key challenges facing the business from a list provided. They could also mention additional challenges which were not listed. 36 firms responded to the question. The number of times each possible answer was chosen is shown in the figure below. High energy costs and high input costs are the most commonly identified challenges, followed by lack of available skills and crime and theft.

⁴ Note: percentages do not add up to 100% due to rounding.

Figure 16: key challenges facing the business (n=37)



Source: survey data

The firms that answered “other” suggested that they faced a variety of challenges. Once again, poor economic conditions were cited as a challenge by some as well as key costs such as fuel, rates, road tolls and product development and ISO grading. One firm cited a lack of competitiveness with established firms as a key challenge and another lack of infrastructure. Finally, one firms noted a shortage of raw materials.

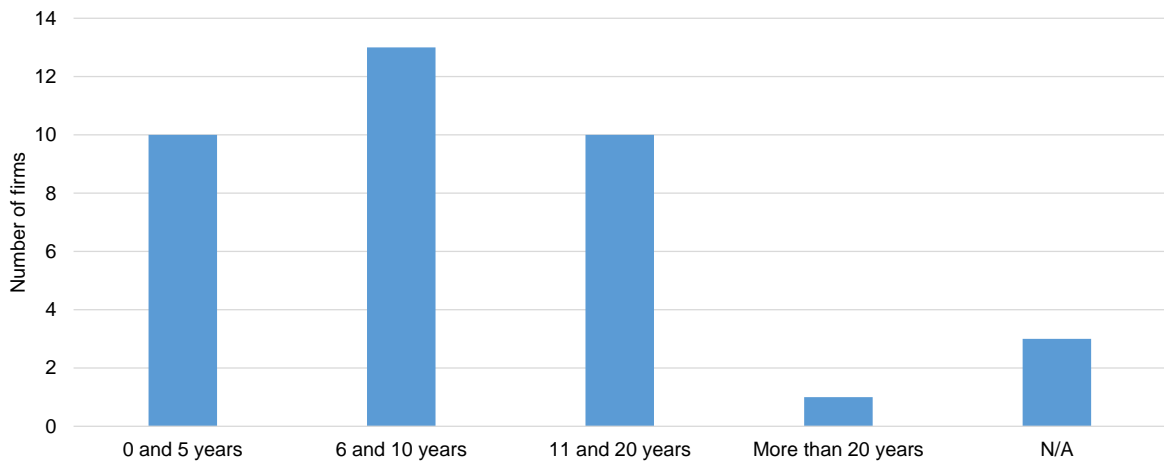
The survey results in terms of company performance suggest that many firms in Aeroton and Industria West are facing poor economic conditions and consequently are running at relatively low levels of capacity utilisation. On average, around 90% of sales are to customers in South Africa, and given the weak economic environment domestically, this explains why firms are facing low levels of demand. High energy costs and other input costs are seen as challenging in this environment.

4.3.3 Technology and investment

Plant and equipment age

Firms were asked to report the average age of their plant and equipment. 37 firms responded to the question, 20 in Industria West and 17 in Aeroton. The results in the two areas were very similar. The largest number of respondents reported that the average age of the plant and equipment was between 6 and 10 years old.

Figure 17: average age of plant and equipment (n=37)



Source: survey data

The table below reports a cross-tabulation of whether firms are growing or not growing with the average age of plant and equipment. The null hypothesis that whether the firm is growing is independent of the age of its plant and equipment could not be rejected at the 5% level so we cannot say with 95% confidence that there is a significant difference in results for firms with older or younger plant and equipment. From the table, it does seem as if firms with very old equipment (11 years old or more) are much more likely not to be growing, and with confidence of 81% we can conclude that there is a relationship between firm growth and equipment age.

Table 5: Growth vs. plant and equipment age

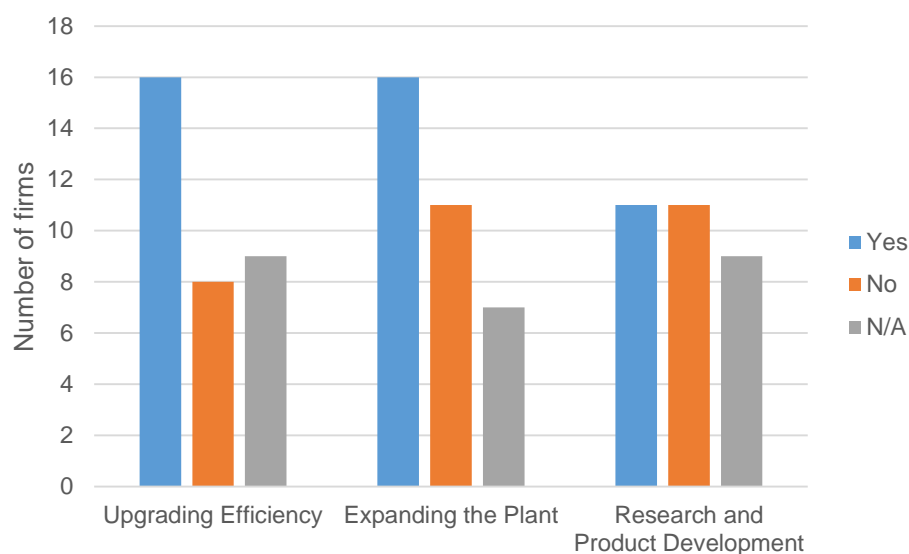
	Not growing	Growing	Total
0 and 5 years	4	5	9
6 and 10 years	7	6	13
11 year +	9	2	11
Total	20	12	33
X ² P-value			0.19

Source: survey data, own calculations

Investments in the plant

Firms were asked whether the company had made substantial investments in upgrading efficiency, expanding the plant or in research and product development in the past two years. 36 firms responded to the question, 19 from Industria West and 17 from Aeroton. The greatest number of firms (almost half of respondents) had made substantial investments in upgrading efficiency and expanding the plant. Only 11 of the 36 firms (31%) had made substantial investments in research and product development. 21 firms out of the 35 (60%) had made a substantial investment in at least one of the three categories. This is consistent with the fact that many firms seem to be struggling in difficult economic conditions and with falling customer demand. Firms are mainly investing in cost-cutting efficiency measures, and fewer firms are investing in product development and innovation. However, a substantial number have invested in expansion, which is more positive.

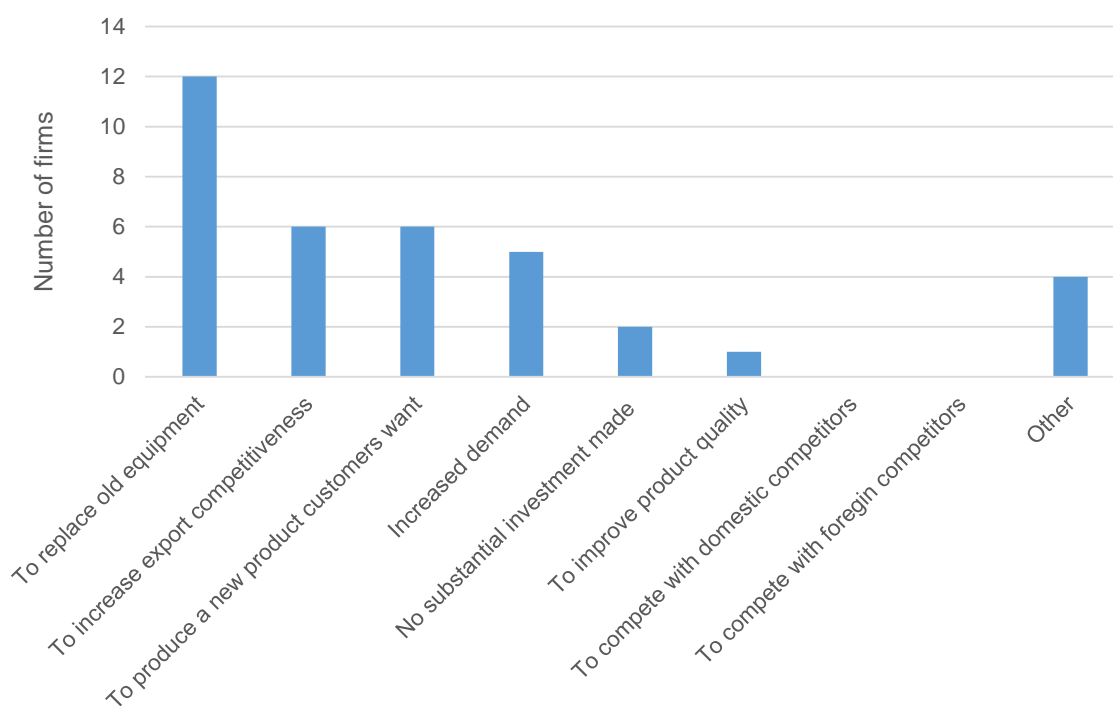
Figure 18: investments in the plant in the past 2 years (n=36)



Source: survey data

Firms were then asked, if the company had made any substantial investments in the past two years, what the most important motivation for the investments in machinery was. 36 firms responded to this question and by far the most common response was that they had invested in order to replace old equipment. Once again, this is consistent with firms trying to cut costs and improve efficiency in tough times, rather than with development and innovation. Increasing export competitiveness and producing a new product that customers want by contrast were only cited as reasons for investing by half the number of firms. Four firms answered “other” of which two were new firms whose investment was in setting up the plant, one had invested in reducing labour intensity and the fourth cited efficiency improvements as motivation for the investment.

Figure 19: reasons for investments in the plant in the past 2 years (n=36)

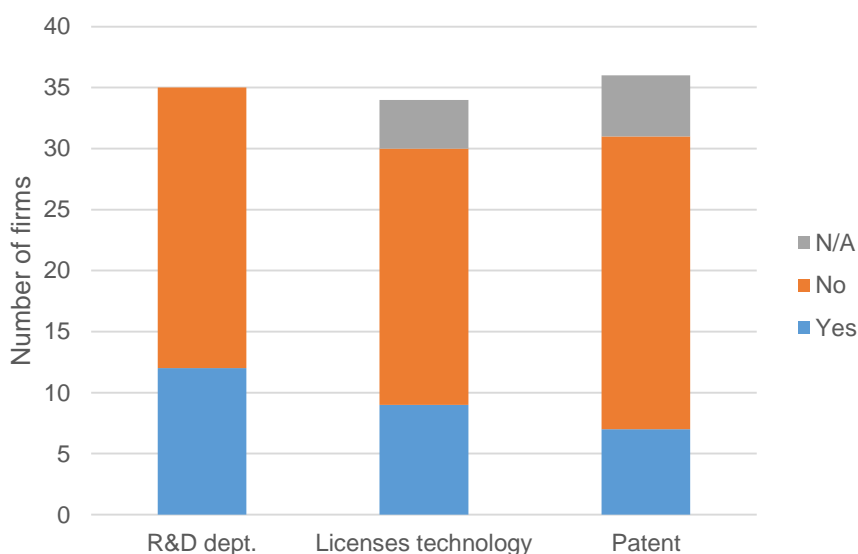


Source: survey data

Research and development

Respondents were asked whether the firm has a research and development department, whether it currently licenses technology and whether it currently holds a patent. 35 firms responded to the first question, of which 12 reported that they have an R&D department (34%). 35 firms answered the question about technology licensing, of which 9 reported that they do currently license technology (26%). Finally, 36 firms answered the question about holding a patent, of which only 7 reported having a patent (19%). For the most part, therefore, the firms which responded do not seem to be high-tech firms but about a third of firms surveyed do at least have some kind of research and development team.

Figure 20: levels of research and innovation (n=35, 35, 36)



Source: survey data

In terms of a comparison of the two areas, the only substantial difference between the two is that twice as many R&D departments were reported in Aeroton as in Industria West. This suggests that firms in Aeroton tend to be more technology and research-driven which makes sense since the size of firms in Aeroton tends to be higher, and the types of products being manufactured is more complex.

Table 6: Level of research and innovation by area

	Patent	Licenses technology	R&D dept.
Aeroton	4	4	8
Industria West	3	5	4

Source: survey data, own calculations

The table below reports a cross-tabulation of whether firms have an R&D department or not and whether they are growing or not growing. The table illustrates that firms with an R&D department are more likely to be growing, whilst firms without an R&D department are much less likely to be growing. The null hypothesis that whether the firm has an R&D department is independent of whether it is growing was rejected at the 5% level so we can conclude that there is a significant difference in results for firms which have an R&D department and firms which do not have an R&D department. Firms with an R&D department are more likely to be growing.

Table 7: Level of research vs. growth

	R&D dept.	No R&D dept.	Total
Not growing	4	17	21
Growing	8	5	13
Total	12	22	34
X ² P-value			0.012

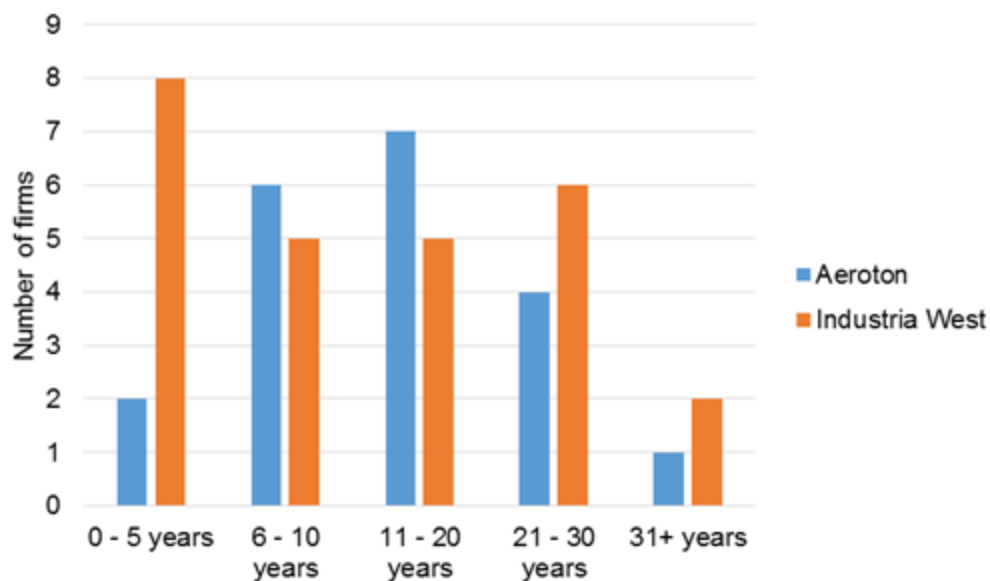
Source: survey data, own calculations

The results of the survey in terms of technology and investment suggest that there is relatively little research and innovation going on in Aeroton and Industria West, although there is slightly more in Aeroton, perhaps due to the size and activities of firms in the area. Where firms are making substantial investments, they are most often doing so in order to increase efficiency and cut costs. This is consistent with the view presented above of firms facing a challenging economic environment and low levels of domestic demand. The results also show, however, that firms which conduct higher levels of research and development (proxied by the existence of a research and development department in the company) seem to have been less affected by the slowdown and are more likely to be growing their sales. This indicates that there may be a counter-productive cycle where firms are not investing and innovating, but as a consequence are less able to react to declining demand by seeking out new products and markets.

4.3.4 Location decisions

Tenure at current site

The respondents were asked to indicate the number of years that the firm had been located in the current premises. 45 firms responded to the question, of which 20 were located in Aeroton and 25 were located in Industria West. The most common overall response was 11-20 years, but when Aeroton and Industria results are separated we see that the majority of Industria West firms have recently located in the area (0-10 years). While 65% of the Aeroton firms have been operating in current premises in the range of 6-20 years.

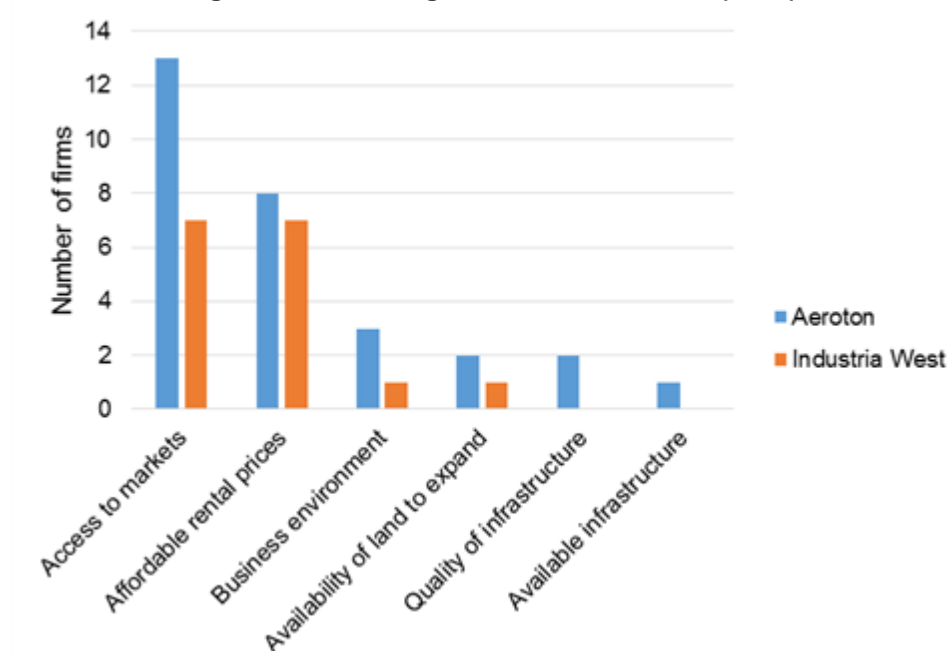
Figure 21: Number of years operating in current premises (n=45)

Source: survey data

The scoping study revealed that the Industria West firms are generally smaller than the heavier manufacturing Aeroton firms and this may explain why firms had been located in Aeroton for longer periods. Small firms may find it easier to relocate as it is easier to find small rental spaces.

The firms were then asked to indicate if there were advantages to the firm's current location. 36 firms responded to the question, of which 30 were indicated that there were indeed advantages to the firm's current location. The remaining responses indicated that there were no advantages to the firm's current location. The firms were given options of potential advantages and asked to choose up to 3 advantages. 33 firms responded to the question with respondents choosing a between 1 and 3 advantages amounting to 44 selections. The most common advantage identified by the firms was the access to markets followed by affordable rentals with 61% and 47% of firms selecting the advantages respectively.

Figure 22: Advantages of current location (n=33)



Source: survey data

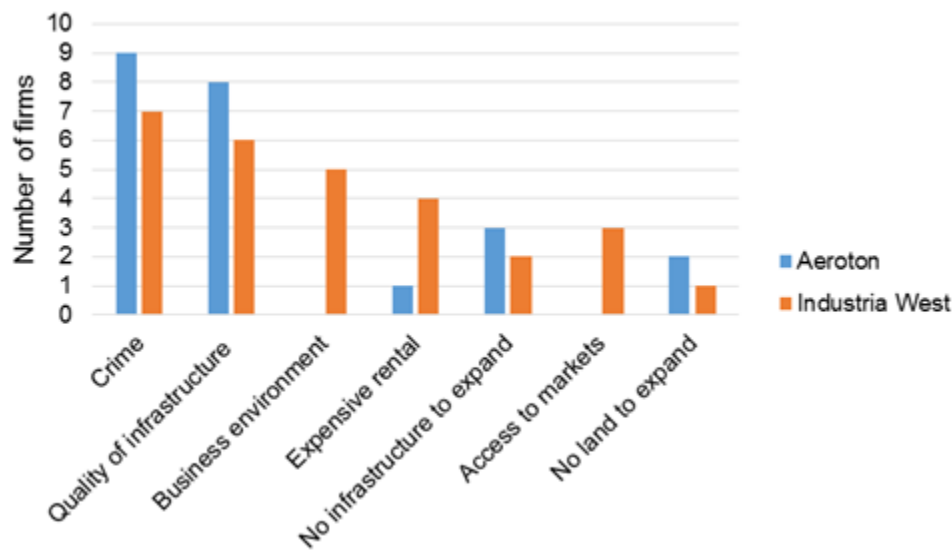
The firms in both Industria and Aeroton value the location of the industrial areas, the main advantage of which is access to markets. Both Industrial areas are well located in terms of proximity to customers, suppliers and labour with Aeroton also being close to highways. This means that firms can keep transportations cost down.

Firms were given an option to identify other advantages not provided as options and 5 firms identified additional advantages. The most commonly cited additional advantage was access to labour with 90% of the respondents identifying it as an advantage to firm location. Other advantages identified by firms were access to sufficient amount of power to run machinery and proximity to suppliers.

The respondents were also asked whether there were disadvantages to locating in the firm's current industrial node. 81% of the responses indicated that there were disadvantages to the firm's current location. The survey results show that firms in Aeroton believe that there are disadvantages to the location, all the Aeroton respondents answered in the affirmative to the question. While 68% of Industria West respondents stated that there were disadvantages to the firms location, 6 identified that there we none. The firms that answered the question in the affirmative were asked to select up to 3 disadvantages from 7 options. The disadvantages that

were cited by most respondents were quality of infrastructure and crime. This is the case in both industrial areas.

Figure 23: Disadvantages of current location (n=37)



Source: survey data

The survey results also show that some respondents believe that the business environment in Industria West disadvantages the firms and rental in Industria West is more expensive. In Aeroton the third most commonly cited disadvantage is lack of infrastructure to expand. Though only represents 3 firms it is noteworthy as the 3 firms may have been those that attempted to expand but would also mean that firms that want to relocate to Aeroton would face similar challenges.

Overall the firms operating in Aeroton and Industria West have been in current premises for varied periods of time. The expectation was that the Industria West firms would have been in their premises for longer periods as this is a well-established industrial node, however, the survey shows that there are more new firms locating in the area than Aeroton. The bad business environment may mean that firms relocate to other areas or close down creating space for new firms to move to the area. What the survey shows is that firms' location decisions are mainly informed by access to markets, rental prices, quality of infrastructure and the state of crime. In the next section the survey attempts to tease out the issues related to the quality of infrastructure.

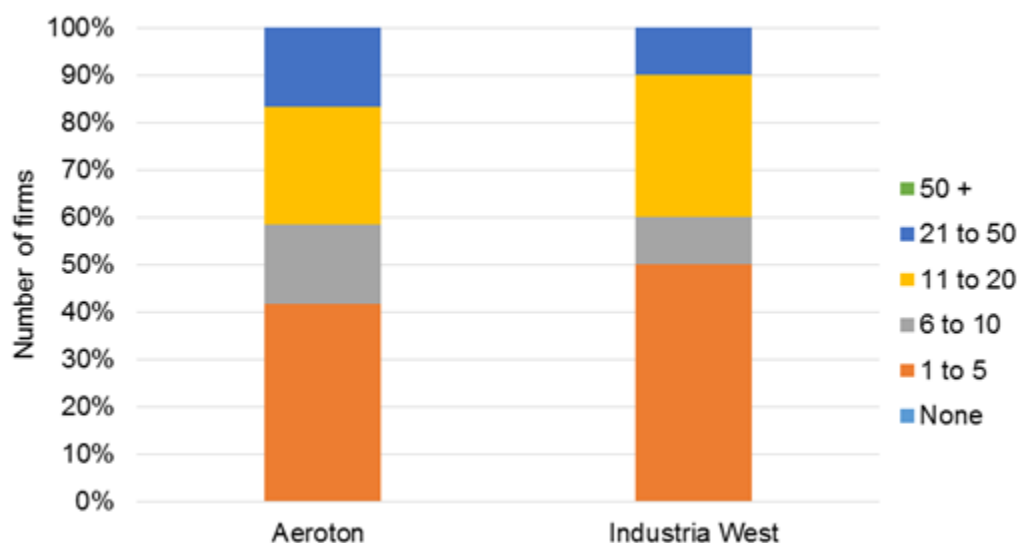
4.3.5 Infrastructure

Power

The next issue that the survey sought to understand was the quality of the infrastructure including electricity, water and roads in the industrial areas and the potential impact on the businesses. The first question in this section sought to determine whether firms in the area experienced power outages. Respondents were asked whether or not the firm had experienced a power outage in the last 12 months. 94% of the respondents indicated that the firm had experienced power outages and or voltage fluctuations. The respondents were asked to indicate the number of days that the firm experienced power outages in the past 12 months. The results show that firms experience more days with voltage fluctuations than power outages. However, some respondents indicated that they have not experienced voltage

fluctuations. The results indicate that the most firms experienced power outages in 5 days in the last 12 months while experiencing voltage fluctuations in 6-10 days.

Figure 24: Number of days in a year with power interruptions



Source: survey data

Interestingly, 4 respondents have indicated that the firms have experienced more than 50 voltage fluctuations in last 12 months. It is surprising that firms experience significantly more voltage fluctuations than others in the same area. The data does not offer any explanations for this with these responses being evenly distributed between Aeroton and Industria. It may be that other firms have implemented measures to limit the impact of the voltage fluctuations and would then either not notice them when they occur or would only to a lesser extent.

The number of responses on the number of days with power outages are similar in both industrial areas with the only slight differences arising from the differences in the number of responses by industrial node.

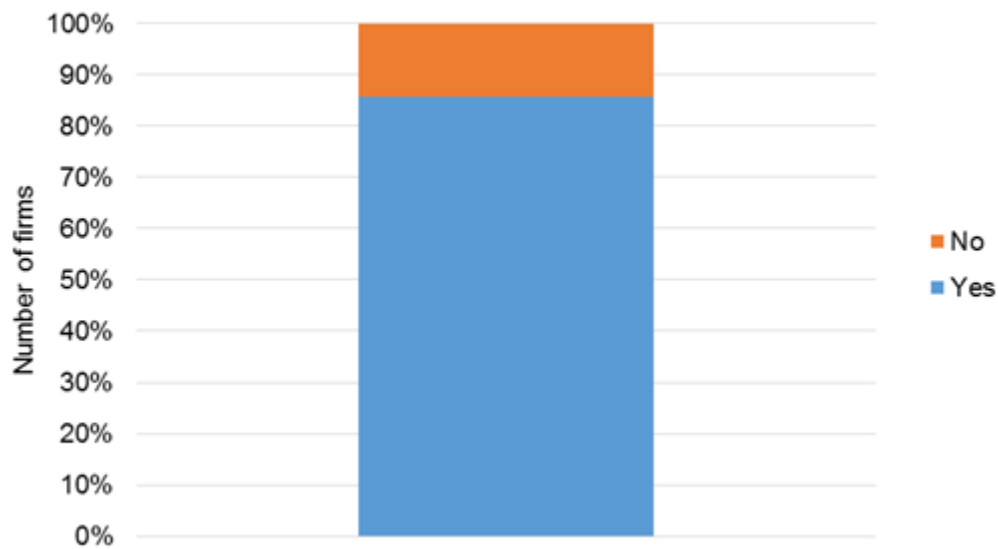
The survey data shows that City Power provides power to the firms in both Aeroton and Industria West. Respondents identified City Power as the firm's power provider. Those respondents that did not know the firm's power provider are likely those that are renting premises and utility accounts are handled by the landlord. The in-depth interviews will shed further light on this. The last question on power was whether firm's had received advanced warning about the power outages. 97% of responses indicated that their firms had never received advanced warning of power outages.

At least for Aeroton and Industria West, the quality of the power infrastructure is mainly under the control of the City as the provider and actions can be taken to reduce the number of power outages, provide advance warnings about power outages and provide stable power.

Water

The survey results show that firms in both Aeroton and Industria West are generally happy with water supply. 15% of respondents indicated that the water supply in the area does not meet the needs of their firms. Dissatisfaction with water supply is not unique to a particular industrial area. 3 of the 5 dissatisfied firms are located in Aeroton while the rest are in Industria West. The in-depth interviews explored in more detail in what ways the water supply is not sufficient for firms' needs and this will be discussed below.

Figure 25: Satisfaction with water supply (n=35)

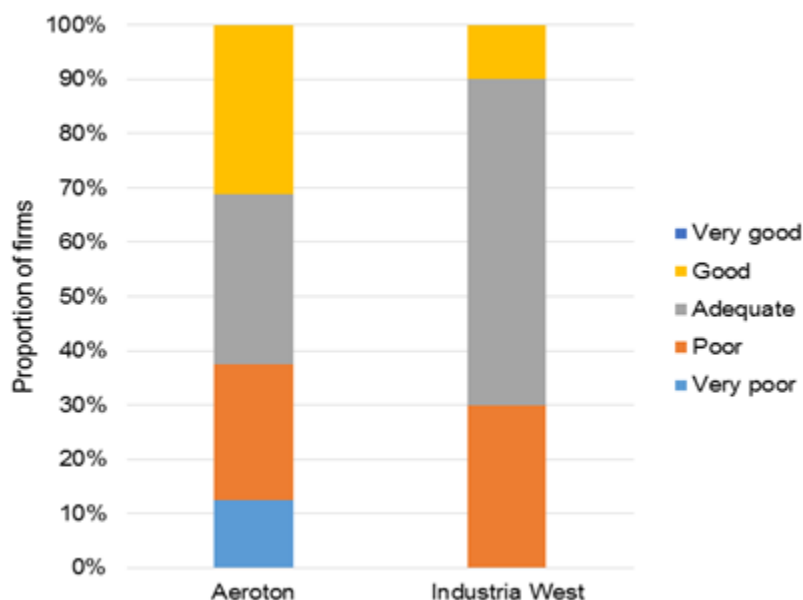


Source: survey data

Roads

Road infrastructure in both the industrial areas appears to be adequate for the firms in these areas. Respondents were asked to describe the road infrastructure in the industrial nodes. The road infrastructure in Industria West appears to be adequate or good with 70% responses indicating as such. In Aeroton 63% responses indicated that the roads were either adequate or good.

Figure 26: Quality of road infrastructure (n=36)



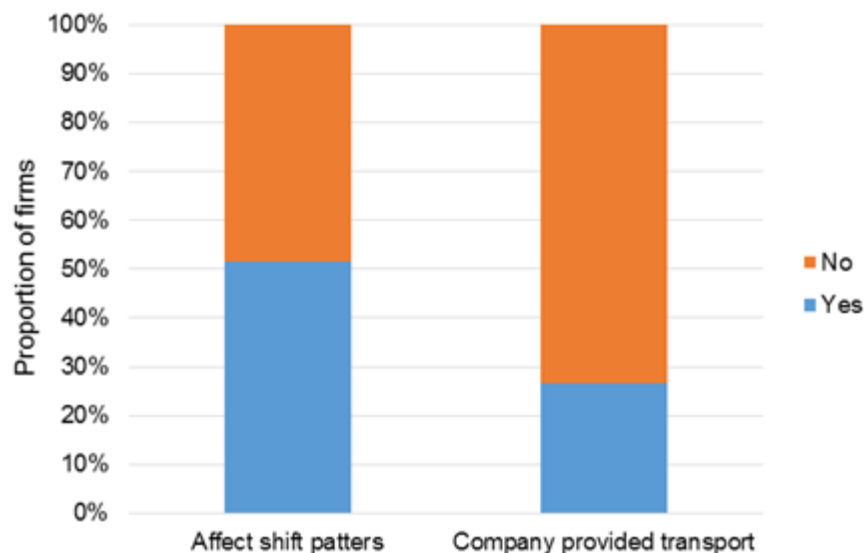
Source: survey data

However, maintenance of the existing infrastructure is important as 33% of the survey respondents were unhappy with infrastructure and with time the roads could deteriorate. The main issues with the roads that were identified by firms during the interviews were potholes and open manholes.

Public transport

To ascertain whether the Aeroton and Industria West were well serviced by public transport a series of questions were asked about transport to and from these area. The hypothesis was that availability of public transport particularly after hours would impact the shift patterns of firms. Recall that 9 firms indicated that they run shifts. The firms that run shifts are likely to be operating 24 hour days. Respondents were required to indicate whether availability of transport affects the firm's shift patterns. 51% of responses indeed indicated that this is the case. To determine the importance of this issue to firms, respondents were asked to indicate whether the firms provide transport for employees. 26% firms provide transport to employees.

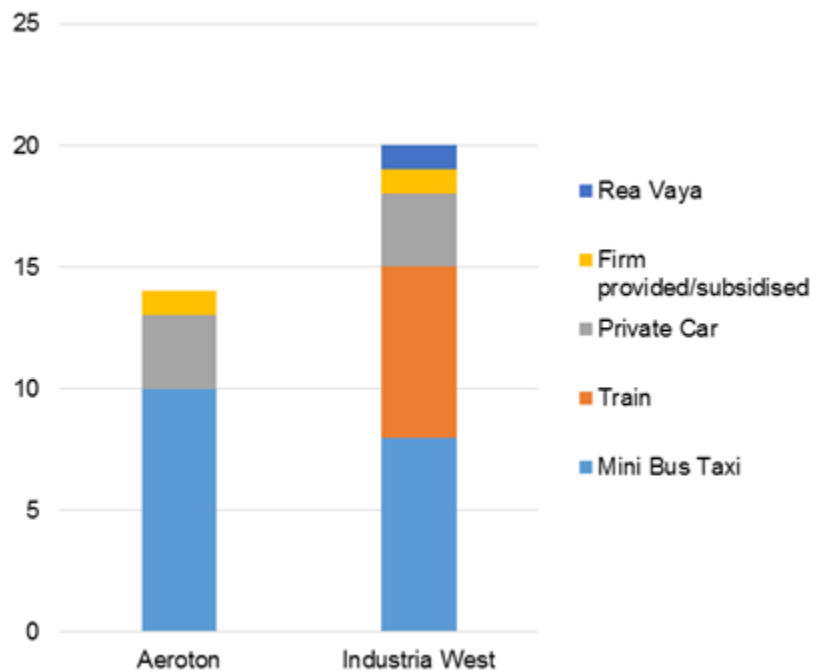
Figure 27: Transport for employees (n=33,34)



Source: survey data

To understand whether the industrial areas are serviced by public transport at least during the day, respondents were asked to indicate the most frequently used mode of transport by the majority of employees of the firm. Overall responses show that the majority of employees use mini bus taxi's to get to and from work. This may be a consequence of the lack of public transport in the areas. Looking as the industrial nodes separately, one observes that Aeroton is not covered by public transport. Employees use mini bus taxis, private cars or firm provided/subsidised transport. Industria West on the other hand also has the Rea Vaya and the train. The in-depth interviews also indicated that public buses are available in Industria West. It may be that this has not been identified as it is used by the minority of employees in firms.

Figure 28: Most frequently used mode of transport (n=33)



Source: survey data

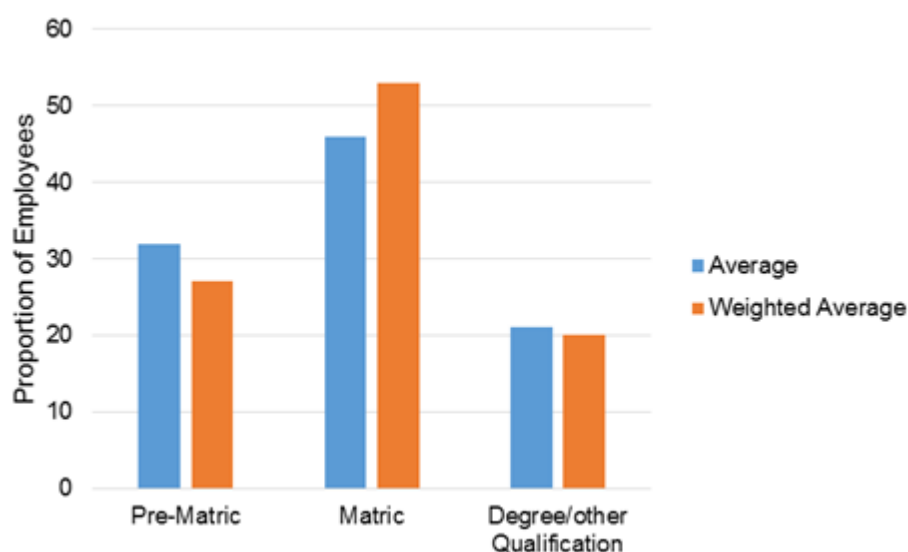
The survey results show that the power and public transport are not provided optimally for firms. There are power interruptions in the form of unplanned power outages and voltage fluctuations and Aeroton is not serviced by public transport. The firms do not receive advanced warning of power interruptions which may lead to interruptions productions particularly for the manufacturing firms. Though the Rea Vaya is available in Industria West the surveyed firms do not seem to be making much use of it. The lack of availability of transport after hours also impacts on the shift patterns of firms which may choose to run less than optimally or provide own transport at additional cost to the firm. Water supply and road infrastructure appears be is satisfactory. Seeing as quality of infrastructure is important for a firm's location decisions, there may be motivation to address the challenges with power and public transport.

4.3.6 Skills and training

Education level

The respondents were asked to estimate the proportion of their employees that had not acquired a matric certificate, acquired one, and those who had a degree or another qualification. 27 firms responded to this question, and the responses illustrate that on average the firms in Aeroton and Industria West have more or less the same proportions of employees in each category. The proportions of the levels of education were averaged out in order to determine the mean proportion of employees with pre-matric, matric and matric in both areas. A weighted average was also calculated based on the number of employees that each firm has.

Figure 29: Level of Education (n=27)

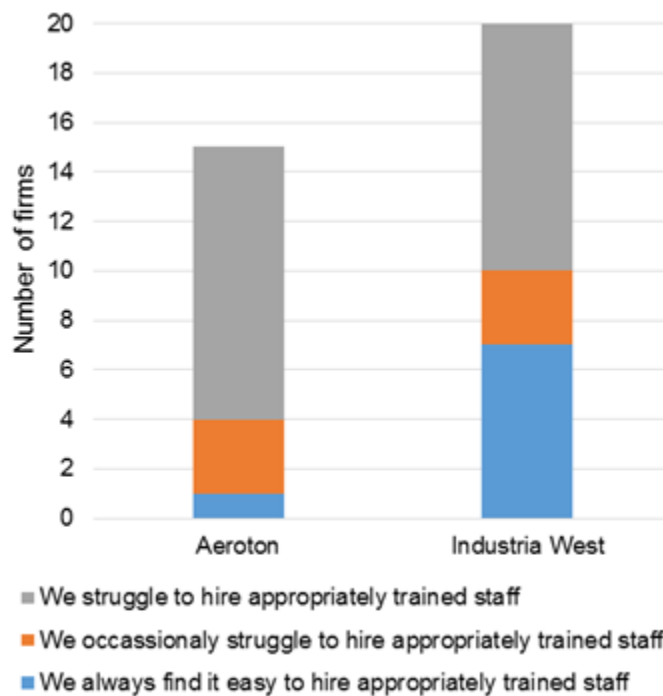


Source: survey data

The data analysis reveals that the largest component of employees have a matric certificate, with the lowest component having acquired a degree. This may be attributed to the fact that the greater proportion of firms that took part in the survey are manufacturing firms which may require a large proportion of unskilled labour to perform some of the menial work, while a smaller proportion of employees need to be qualified. Further analysis employing the weighted averages reveals that proportion of firms that have pre-matric students are lower and the proportion with Matric is higher when the weighted average is used. This suggests the smaller firms employ a greater proportion of employees with lower qualification levels.

The low levels of education is closely linked to the difficulty faced by firms in hiring experienced staff. The firms in Aeroton and Industria West reported that they encounter some level of difficulty when hiring appropriately trained staff even though Industria West reported lower levels of difficulty. From the figure below, one firm in Aeroton reported that they find it easy to hire appropriately trained staff, versus seven firms in Industria West who find it easy. The difficulty of hiring appropriately trained staff may be due to the different skills that the respondents were making reference to. In the in-depth interviews it was identified that it is less difficult to hire employees who carry out business administration and management posts, versus technical work. This will be discussed in greater detail in the interview analysis later in the report.

Figure 30: Company's experience of attracting employees with relevant skills and experience (n=25)



Source: survey data

In the table below, the hypothesis that the ease of hiring is independent of number of the employees was tested and could not be rejected at 5% level of significance. This reveals that there is no relationship between the number of employees and their difficulty to hire employees. This implies that regardless of the size of the firms all firms do struggle to hire appropriately trained staff.

Table 8: Number of Employees and Ease of Hiring

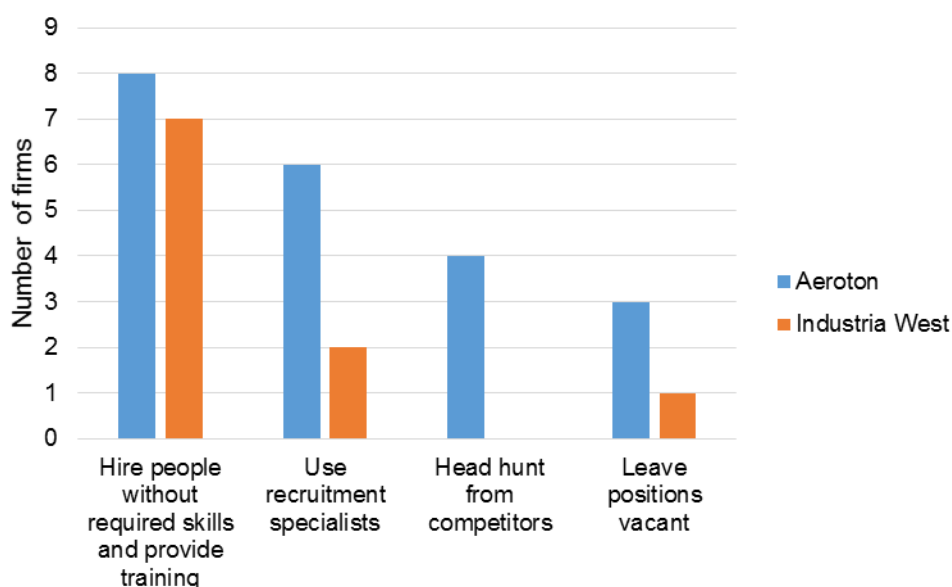
	Easy to Hire	Struggle to Hire	Total
<200 Employees	9	21	30
>200 Employees	1	3	4
Total	10	24	34
X ² P Value			0.836670

Source: survey data, own calculations

Hiring

The 24 firms that reported that they struggled to hire appropriately trained staff were asked how they usually rectify this issue. They were given the options listed in the figure below, and selected the relevant responses. In light of the inability to hire appropriately trained staff, the most common response in both areas was that “firms hire people without required skills and provide training”. This was followed by the “use of recruitment agencies”, with three times as many firms in Aeroton having reported this as an option. Interestingly firms in Aeroton seem to “head hunt from their competitors”, while this practice was not reported in Industria West. It is worrying that some of the firms noted that they “leave the positions vacant”. Firms may leave the positions unfilled due to the inability to find a candidate with the relevant skills and experience.

Figure 31: Methods used to hire employees (n=22)



Source: survey data

Training

Unsurprisingly, given that most firms reported that they hire employees without the appropriate skill-set and provide training, 36 firms reported that they offer their employees some form of training (which may be a combination of two options) as shown in the table below. In-house training was the most popular option as most firms noted that they offer new or in-experienced employee's on-the-job training so that they can grapple with the machinery and equipment operation particularly in manufacturing firms. A lower proportion of the firms out-source training as this is a costly and timely exercise.

Table 9: Forms of training (n=34)

Forms of training	Number of firms
In-house training facility	26
Private training schools	6
Vocational/technikons	2
Business partners (other firms)	2
University	1
Total	37

Source: survey data

It is evident from the data analysis that there are high levels of employees who do not possess a matric certificate which may call into question their knowledge of basic numeracy and literacy, machine operation and health and safety measures among other competencies of the employees. The firms therefore offer on-the-job training in order to equip their employees with the necessary skills to perform the tasks at hand.

However, firms in the survey identified other approaches of dealing with inadequately equipped employees. The firms noted that they poach employees from their rivals or leave the positions vacant. Poaching from rivals may deter firms from investing in resources for training for fear of losing to their competitors. This may ultimately have detrimental effects on the

productivity and competitiveness of firms, which will ultimately decrease further investment and expansion. Leaving the positions vacant also echoes the inability of firms to hire employees with relevant skills. Implementing schemes that can provide centralised training schools of skills such as machine operation and health and safety may provide a pool of labour for the firms, allowing them to divert resources towards research and development and expansion strategies.

4.3.7 Interactions with the City

Have respondents interacted with the City?

The survey reported that 9 firm's interacted with the City, with more or less the same proportions from Aeroton and Industria West as tabled below. The level of interaction with the City may not be due to the strong opinion that the City is unreliable and unhelpful as discussed in the selection bias above, but can be attributed to the fact that some of the companies rent the properties, and thus the property owner communicates with the City on their behalf.

Table 10: Interaction with the City

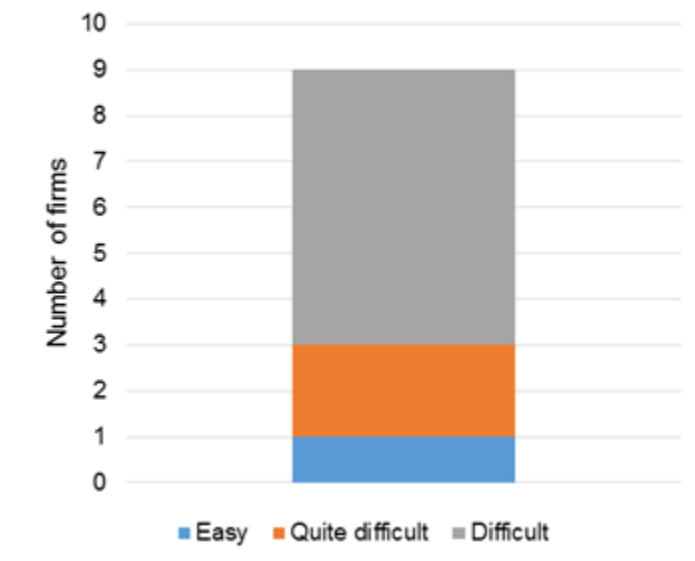
Interacted with the City	Aeroton	Industria West	Total
Yes	5	4	9
No	9	15	23

Source: survey data

How easy was interaction with the City?

Despite the small proportion of firms that interacted with the City, seven out of nine (78%) firms stated that they experienced some level of difficulty when communicating with the City as illustrated in the Figure below. The major issue was that the firms struggled to get in touch with the appropriate contact. For example, one of the respondents stated that after having spent 30 minutes battling to get hold of the right person, their conversation was simply terminated without having been offered any assistance. Another issue which customers struggled to resolve were around water and electricity billing queries where after issuing a complaint, they were not did not receive any form of assistance.

Figure 32: Ease of Interaction with the City of Johannesburg (n=9)



Source: survey data

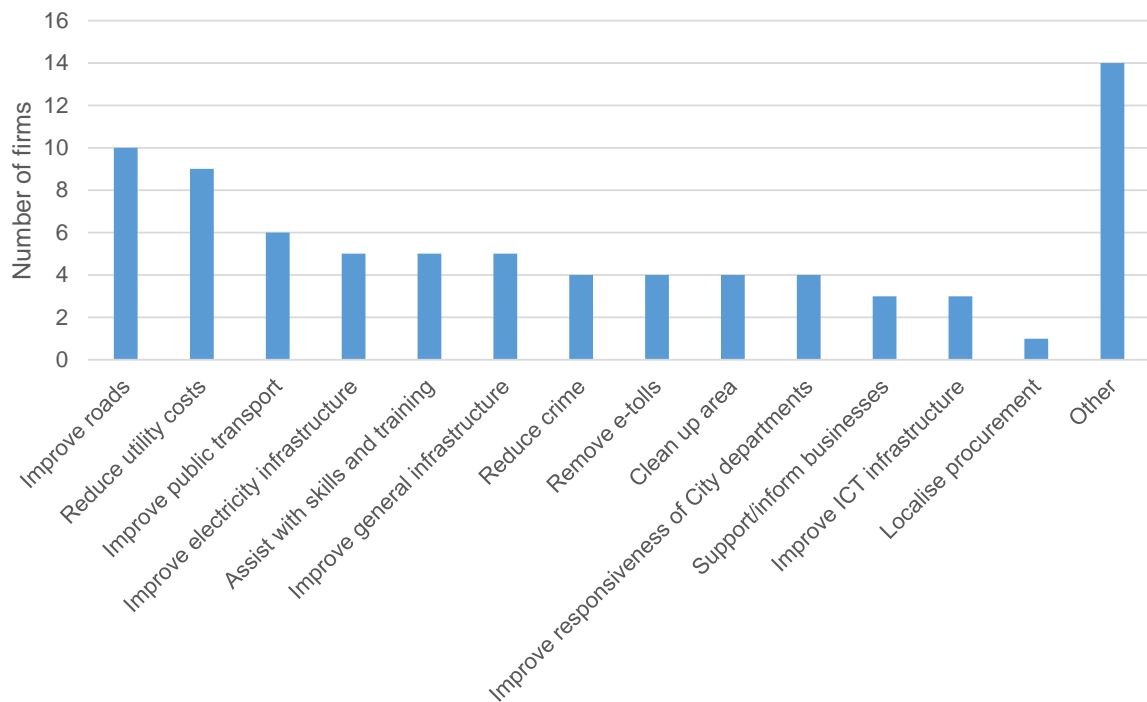
The firms in the survey reported that their interaction with the City is quite low since their property owners may interact with the City on their behalf. Furthermore, the firms that did interact with the City found it very difficult to get their issues resolved. The in-depth interviews, which are discussed in more detail below, reveal that the call centre and the website were not user-friendly and did not provide a source of credible information or assistance with respect to billing enquiries, power interruptions, water stoppages and any other City-related queries.

4.3.8 Recommendations for the City

At the end of the survey, firms were asked two open-ended questions in order to give them an opportunity to make recommendations to the City directly. For these questions no categories were provided and firms had the ability to make any answer they thought was appropriate. Responses were then grouped into themes to assist in the analysis of the responses.

The first questions asked firms to make three suggestions for things the City could do to help improve the competitiveness of their business. The responses were quite wide-ranging, but the most common response was to improve the quality of roads in the area, closely followed by reducing the cost of utilities, especially electricity. Next came improving public transport and electricity infrastructure, assisting with skills and training and improving general infrastructure. Those who wanted better quality roads mentioned a general need for improvements in quality as well as pothole repair, traffic light repair and better road signage. In terms of training, requests were made for the City to set up technical training centres and facilitate or assist with the training of technical staff and artisans in particular. This is in line with the interview responses where the category of skills where the shortage is most acute appeared to be in technical skills like machine operation.

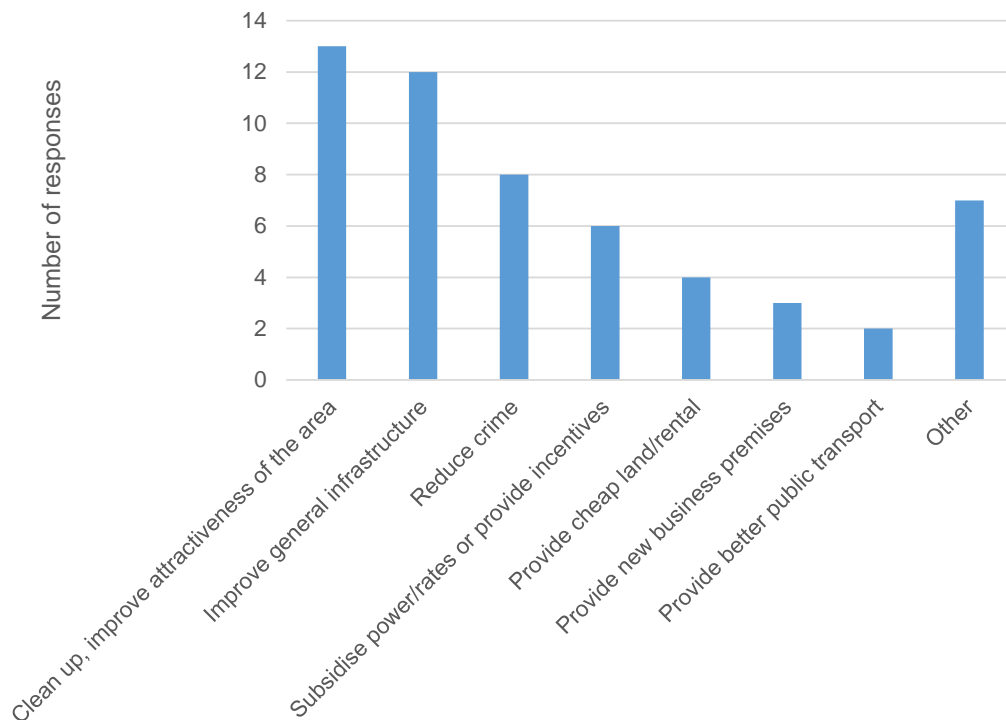
Figure 33: what can the City do to help improve the competitiveness of your company?



Source: survey data

The second open-ended question that firms were asked was how the City can attract, retain and grow businesses in the area. Again they were asked to make three suggestions. The most common response was that the city should clean up the area and improve the attractiveness of the area to firms and their customers. Secondly, firms felt the City should improve the quality of infrastructure in the area. Reducing crime was also seen as important, and several firms suggested that the City could attract new firms by providing subsidies or incentives and by providing cheap land and reduced rentals. Again, the most common responses are all areas in which the City can effectively intervene to improve the attractiveness of the areas.

Figure 34: how can the City attract/retain/grow businesses in the area?



Source: survey data

Overall, the key issues for the City to address in order to improve firm competitiveness appear to be infrastructure (particularly roads, public transport and electricity infrastructure), skills and training, cleaning up the area and dealing with crime and providing assistance for small businesses. In terms of attracting new firms to the area, the key interventions are to improve infrastructure, clean up the area and reduce crime.

4.3.9 Conclusion

The survey results suggest that many firms in Aeroton and Industria West are facing poor economic conditions, declining demand and low levels of capacity utilisation. Most are selling predominantly to the domestic market which has been under pressure, particularly in industries such as mining and construction. Perhaps partly due to these challenges, the results suggest that there is relatively little research and innovation going on in Aeroton and Industria West, although there is slightly more in Aeroton, perhaps due to the size and activities of firms in the area. Where firms are making substantial investments, they are most often doing so in order to increase efficiency and cut costs. This is consistent with the view presented above of firms facing a challenging economic environment and low levels of domestic demand.

Overall the firms operating in Aeroton and Industria West have been in current premises for varied periods of time. The survey shows that firms' location decisions are mainly informed by access to markets, rental prices, quality of infrastructure and the state of crime. In the next section the survey attempts to tease out the issues related to the quality of infrastructure.

The survey results show that the power and public transport are not provided optimally for firms. There are power interruptions in the form of unplanned power outages and voltage fluctuations and Aeroton is not serviced by public transport. The firms do not receive advanced warning of power interruptions which may lead to interruptions productions particularly for the manufacturing firms. Though the Rea Vaya is available in Industria West the surveyed firms do not seem to be making much use of it. The lack of availability of transport after hours also

impacts on the shift patterns of firms which may choose to run less than optimally or provide own transport at additional cost to the firm. Water supply and road infrastructure appears to be satisfactory. Seeing as quality of infrastructure is important for a firm's location decisions, there may be motivation to address the challenges with power and public transport.

Firms in both areas struggle to employ appropriately skilled workers, particularly for technical positions. Solutions used are to train on the job, poach employees from their rivals or leave the positions vacant. Poaching from rivals may deter firms from investing in resources for training for fear of losing to their competitors. This may ultimately have detrimental effects on the productivity and competitiveness of firms, which will ultimately decrease further investment and expansion. Leaving the positions vacant also echoes the inability of firms to hire employees with relevant skills. Implementing schemes that can provide centralised training schools of skills such as machine operation and health and safety may provide a pool of labour for the firms, allowing them to divert resources towards research and development and expansion strategies.

The firms in the survey reported that their interaction with the City is quite low since their property owners may interact with the City on their behalf. Furthermore, the firms that did interact with the City found it very difficult to get their issues resolved. The in-depth interviews, which are discussed in more detail below, reveal that the call centre and the website were not user-friendly and did not provide a source of credible information or assistance with respect to billing enquiries, power interruptions, water stoppages and any other City-related queries.

Key issues for the City to address in order to improve firm competitiveness in Aeroton appear to be infrastructure (particularly roads, public transport and electricity infrastructure), skills and training, cleaning up the area and dealing with crime and providing assistance for small businesses. In terms of attracting new firms to the area, the key interventions are to improve infrastructure, clean up the area and reduce crime.

5 In-depth firm interviews

As discussed above, a series of in-depth interviews were conducted in Aeroton and Industria West in order to probe some of the findings of the firm survey in more detail. Ten firms in each area were interviewed. In addition, five firms were interviewed in Wynberg in order to get an overview of the node and understand at a high level if it faced the same challenges as the other areas. For each area, we report the key insights arising from the interviews according to key themes. In general these build on the results of the survey, providing greater depth and more detailed insights.

5.1 Aeroton

Some of the Aeroton interviews were conducted with firms in manufacturing. The specific sectors covered were plastic packaging; food; steel fabrication; telecoms equipment for mines; heat control equipment and sterile fluids. One distribution company was also surveyed which specialises in the distribution of forklifts.

The interviews were semi-structured to explore the key issues systematically and to inform the design of the firm survey. The aim was to first of all map the activity taking place, the types of firms in Aeroton and the size of firms and then to understand their performance in recent years, the reasons for growth or decline in sales and how competitive firms are in relation to domestic and foreign competitors. Questions then aimed to understand the key challenges being faced by firms and how these impact on their competitiveness. In particular, the influence of factors under the control of the City were probed in order to understand how intervention by the City could assist firms in improving their competitiveness. Key areas of discussion under this heading were electricity supply and public transport. Firms' approaches to research and development were probed, as well as the nature of investments being made into the business. Finally issues of skills and training were explored. A detailed list of the interview themes used is provided in Annexure 1.

The firms interviewed ranged in size from 12 employees to 700 employees and most of the firms interviewed have been in Aeroton for more than 20 years with one having been there since the 1950's. The firm that had been in Aeroton for the shortest period had been located in Aeroton for 10 years. About half these firms are operating below nameplate capacity. In terms of turnover, the smallest of the interviewed firms makes approximately R15 million a year and the largest makes about R1 billion.

In addition to providing information on the firms themselves, some of the interviews also provided valuable insights into the operations of other branches of the same companies in other areas, giving insights to the state of Johannesburg municipal services versus other municipalities.

5.1.1 Performance, competitiveness and market conditions

The firms interviewed generally cited a challenging operating environment. In general, manufacturing firms tended to have similar concerns. The manufacturing firms identified the factors which have a significant impact on their competitiveness as operational efficiencies which are in turn dependent on input costs such as labour, electricity and water, raw materials. Though some of these factors are not in the control of the municipality it is important for firms that the different factors work together for them to be able to achieve world class efficiencies and competitiveness.

The area was affected by the recent metalworkers strike. Although not all the firms' employees were involved in the strike, the area in general was disrupted. Even those not directly affected sometimes suffered indirectly as they were unable to source required inputs from suppliers who were directly affected.

A number of firms noted that they had reduced their staff complement in the past 3 years. One firm had actively retrenched and others had reduced the number of employees by not replacing those who left the organisation. Two firms cited mechanisation as the reason for employing fewer people. This was done to reduce costs. One particularly successful manufacturing firm noted that it had grown employment by 100% over the past 10 years. In the time that employment had doubled, sales had tripled. Another said that it had hired more people in the past 3 years but only because it had moved into new product areas, as there had been no growth in its traditional product areas.

Another trend that was evident from the interviews was that in general demand from customers in South Africa has been flat or declining. This was for a variety of reasons. Firms supplying to the mining sector have been affected by the difficulties in the sector over the past year. Manufacturers supplying to other sectors noted the influx of cheap imports as a challenge affecting their performance. On the other hand, demand from the southern African region has generally been growing. A number of firms noted that they have been trying to grow their customer base in the region in order to reduce the impact of stagnant domestic demand on the business. Others had counteracted the decline by moving into new product areas in order to grow sales. One firm noted that since it was not expecting much growth in demand it was focussing on winning business away from competitors.

In this context, a number of firms cited problems with the local infrastructure in Aeroton as key challenges affecting their competitiveness and the performance of their business. The following section discusses these issues in more detail.

5.1.2 Public Infrastructure

5.1.2.1 Electricity

Electricity outages, surges and dips and cost were cited by many of the firms as a challenge to doing business in Aeroton. Though firms noted electricity cost as a challenge, the manufacturing firms were most concerned about power outages, surges and dips. The consequence of the power outages is lost productivity and production for the duration of the outage, this is especially the case for manufacturing firms. Firms interviewed indicated that the outages usually last for several hours and on average seven hours at a time. The impact of the outage is compounded by the lack of advance warning which would allow firms to plan. Firms have noted that the losses in production could be minimised if firms were given a few days' notice of the outage and the expected duration. A number of the manufacturing firms hire a combination of permanent and temporary employees, so on a day where there will be an outage lasting several hours they could save on costs by not calling on their temporary employees if they were given warning. For example one of the firms has 650 employees of which 350 are wage earners. The lack of information about the duration of the outage often means that employees are on stand-by at the cost of the firm even though there is no production taking place.

The firms that are involved in plastic manufacturing either through injection moulding, blow moulding or extrusion and those producing sterile products are most vulnerable to losses due to power outages. In plastic manufacturing, plastic pellets are melted and then fed into machines that will mould or extrude into the design of the product. When the power goes out the product that is in the machines will harden and have to be scraped from the machines.

There may be granules left in the machines and when the process is restarted when the power returns the first batches may have impurities from the hardened granules and may need to be thrown away. One of the firms discarded product worth R44 509 during the last power interruption and in the period August 2013 to July 2014 the same firm discarded product to the value of R1.7 million. Another firm quantified the cost of lost hours at R2.2 million. This is a cost item for firms that would not necessarily be incurred by competitor firms elsewhere.

All the manufacturing firms indicated that the production losses incurred due to outages were not limited to the duration of the outage but also delay and lost time incurred in resuming production as well as when equipment malfunctions. An outage that lasts 30 minutes can cost a firm approximately 3 hours of downtime. Most of the manufacturing firms have continuous operations and power interruption affect efficiency and performance of the firm.

The power surges also pose a challenge to the production processes of firms as the surges sometimes lead to equipment failing and the firm will have to repair or replace damaged components. Power fluctuations also have an adverse impact on equipment over the long term, causing higher rates of wear and stressing electronic components and systems. This will result in a shorter than normal life for these components.⁵ One of the firms submitted that power interruptions also causes equipment to malfunction post event and setting up production after an interruption contributes to under recoveries.

Another firm interviewed, indicated that they wanted to expand their premises and were informed that they would have to pay the cost additional power infrastructure themselves. The same firm paid R2 million to get a new line for a previous expansion of their plant. Limits on power provision and forcing firms to pay for infrastructure to connect them to the public grid increases the cost of investing in the plant and therefore impacts on firms' decisions to grow.

One of the firms interviewed, also experiences interruption to water supply when there are power interruptions. The firm indicated that water pressure is also a problem. They receive water at pressure of five bars from the Municipality, but require six bars for the processes of the plant. The firm then uses supply tanks to pump water to achieve the extra pressure required. This means that when there is no power the pumps are not effective and the water pressure is too weak for the plant's requirements.

Power outages are such a critical challenge for firms that most of the interviewed firms and all the manufacturing firms interviewed have invested in generators. Some of the firms do not have sufficient generator capacity to run their whole plant but just the critical processes. A generator can cost up to R5 million per generator to install and all the manufacturing firms interviewed had more than one generator. The bigger firms can afford to purchase generators although this diverts resources from more efficient use. Smaller firms are not in the same position as they have limited access to capital. Some of the generators were reaching the end of their useful lives and firms need to replace them.

⁵ Firms have noted that they make every effort to put in reasonable additional components to protect equipment from the impact of unreliable power.

Box 1: Example of Malfunctioning of equipment post power interruption

In Adcock Ingram's extrusion department, the Sheetline 80 PLC was corrupted due to high voltage which results in spikes when the power returns. Also, damage to the communication card of the Heatseal Kiefel 70 during an interruption resulted in six days of down time and under recoveries.

In one month, the extrusion department lost approximately R275 000 of recoveries during power interruptions and incurred material losses of approximately R445 000 for 2014 as well as external software expenses of approximately R20 000.

The power interruptions impact the competitiveness of firms in Aeroton as the direct and indirect costs make firms less efficient and competitive. For the marginal firms in tough markets (e.g. supplying to SA mines, competing with cheap foreign imports) - this is a cost that they can ill-afford. Continuous power is an important factor in firms' location decisions. Some of these firms need to produce 24 hours a day for 7 days a week to be able to compete with imports locally or have competitive exports and due to the power problems instead they produce 6 days a week to allow for catch up in case of production disruptions. On-time delivery is very important to customers and any delay may have an impact on relationships with customers. One of the firms is considering moving some machines to another plant in Cape Town where there are less power interruptions.

5.1.2.2 Public transport

The lack of available public transport for employees was noted as a problem by every firm interviewed. Aeroton appears to be particularly poorly located in terms of the city's public transport infrastructure, despite being located fairly close to a major source of labour in neighbouring Soweto. There are no train or Rea Vaya links into Aeroton and only some of those interviewed appeared to be aware of a public bus route running through Aeroton. For most firms therefore, the form of transport most frequently used by employees was minibus taxis. In general, employees would take a taxi to the taxi rank at Southgate Mall and then either take a connecting taxi or walk the 1-2km to Aeroton. There are some security concerns around this route and muggings seem to be quite common.

There are a number of knock-on impacts of the lack of public transport. First of all, it makes it impossible for firms to ask employees to work overtime. This is since it becomes much more difficult for them to get home later in the evening as minibus taxis are generally not available and there are safety concerns after dark. This makes it difficult for firms to meet customer demand in busy periods.

For firms operating continuous shifts, however, it is an even bigger problem. All the firms operating 3 shifts per day noted that the lack of public transport is extremely challenging. It is impossible for employees to get to and from work for the shift change in the late evening (at 10 or 11 at night), even by minibus taxi. Firms have therefore had to come up with their own solutions at considerable cost. Two firms (both with hundreds of employees) have invested in staff buses in which they pick up and drop off employees at their homes. This involves driving employees from door-to-door which is time consuming and expensive. After dark, however, employees do not feel safe walking even a short distance to their homes. One firm estimated that this costs them around R500 000 per month in terms of fuel and maintenance.

Another firm set up an employee committee to negotiate with a taxi association to pick up employees and drop them at home. The firm subsidises the cost of this transport by 50% but

the model means that the employees are responsible for all the administrative details such as negotiations with the taxi association, organisation of the routes etc.

Given that two thirds of the firms in Aeroton are manufacturing firms, it is likely that the lack of public transport is a problem for the majority of firms. This will be tested in the firm survey which is about to take place. Larger firms can afford to find a solution as described above, although at a substantial cost. Smaller firms are forced to avoid working after hours at all.

The situation is particularly inefficient since a large proportion of the workforce live in the same area. This means that each day, large numbers of employees are travelling to and from the same place but without any coordination of transport across companies. Again, the firm survey will clarify this further, but initial indications suggest that from three of the largest manufacturers in Aeroton alone, between 1500 and 2000 employees are coming in to Aeroton each day, many from the same areas. All of these three companies operate on a 24 hour basis and face the after-hours transport problems discussed above, and all are currently pursuing individual and costly solutions to the problem.

5.1.2.3 Other infrastructure and services

One firm noted that Aeroton is lacking in certain services. For example, the nearest fire station is 15 minutes away which means that firms have to have more costly on-site fire safety equipment. Similarly there is no clinic nearby that employees can use and when there is a need to visit a clinic staff would need to take the day off. Several firms also highlighted the poor quality of the roads in Aeroton.

Over and above the key areas discussed in the report firms raised concerns relating to safety and difficulty in communication with the City. The firms indicated that there were issues with crime several years ago but this has improved over time. However, there is an interest to have more police presence during strikes. The firms also complained about the dust from the mine dumps. On windy days the area is covered in dust and this dust has a negative impact on the products of firms that produce food, food packaging and sterile products as such some firms have installed filters to ensure against dust affecting their products. The mine dust also affects the health of employees.

A few of the firms interviewed indicated that they had attempted to contact the call centre to get assistance but had been sent from pillar to post with no resolution to their problem, the separation of the institutions has resulted in finger pointing. The proposed solution was for the City to have centralised business administration, where firms would be able to come to for help on problems whether it was a City Power or City of Johannesburg issue. Another firm complained about the City's website, indicating that it was not user friendly.

5.1.3 Technology, investment and research and development

Over all, firms did not report a large amount of investment taking place in recent years. A number of firms suggested that they had replaced some old machinery but none had made large scale investments in new technologies. One firm had invested in expanding its product range in response to declining demand in the market for its traditional products.

One firm noted that outdated machinery makes them inefficient and makes it harder to compete with imports. They would like to upgrade the machinery to reduce wastage and improve energy efficiency, however, it is difficult to make this investment when the business is barely profitable. Another firm explained that they had been thinking of investing in a

replacement machine that would make their products substantially cheaper, but given demand currently they are not willing to make such a large investment.

A small number of the firms interviewed stated that they had made investments in upgrading the energy efficiency of their plants. Unsurprisingly, these were mainly the energy-intensive manufacturing firms. Others had invested in new machinery in order to branch into new product areas.

Most of the firms interviewed did not have a dedicated research and development department. This was for a variety of reasons. Some firms were simply too small and noted that the directors of the firm worked on the product development aspect of the business. Others produced a relatively mature product where research and development was not such an important factor. Research and development was not relevant to firms importing or distributing products or with head offices elsewhere.

All of the firms interviewed conducted product testing in-house rather than outsourcing this function. The manufacturing firms generally produced products which adhered to quality standards, either domestic SABS standards, international ISO standards or both.

5.1.4 Skills and training

Another area which was cited as a challenge by almost all of the firms interviewed was skills and training. In general it was found to be difficult to hire people with the required skills and experience and a number of firms noted that they sometimes opt to leave positions vacant when they struggle to find someone to fill the position. The most difficult positions to fill appear to be engineers and production managers. However, even basic machine operation skills appear to be hard to find.

The most frequently cited way of solving this problem is for firms to hire a relatively inexperienced person and to provide them with training. While this can be a very effective way of producing a skilled workforce in the longer term, it does not immediately provide firms with the skills they need and requires planning and for more experienced employees to spend time training and mentoring those less experienced. A risk with this approach is that once the employee has gained sufficient skills and experience as to be useful, these same skills are highly marketable in a skills-scarce environment and the employee may choose to leave. This is a particular problem for small firms who cannot easily afford to invest in employees who will leave soon after.

Some of the smaller firms interviewed also noted that they struggle with levels of basic education in terms of literacy and numeracy as well as English language proficiency. In a factory environment this is problematic in terms of communication, basic machine operation, health and safety etc.

The firms interviewed provide their employees with a variety of training, both in-house and outsourced. In-house training provided includes health and safety training, on-the-job training in areas like machine operation and specialised product training. More advanced types of training will usually be outsourced although one firm noted that it has had internal training courses approved as national diploma courses. The larger firms have in-house training academies where they provide a range of training programmes, some of which are certified.

5.1.5 Opportunities for growth of Aeroton

The firms interviewed indicated in general that they think Aeroton is quite well located. This is mainly in terms of having good highway links which gives them easy access to suppliers and

customers. Aeroton is also in close proximity to a large labour force in Soweto. Those interviewed suggested that the rental in Aeroton is also relatively cheap.

Despite this, firms in general reported a lacklustre performance and one large firm mentioned the possibility of eventual closure if performance did not improve. In this context, frequent costly power outages and substantial transport costs to get workers to and from late shifts seem to be costs that firms can ill-afford and may well be hampering the growth of the area.

There seems to be vacant land in Aeroton which, combined with its locational advantages, suggests that more labour-intensive manufacturing could be attracted to the node if infrastructure and other challenges were resolved. In addition to potentially attracting new firms to the area, some of the existing firms interviewed indicated their willingness to expand. One firm confirmed that it is keen to expand operations in Aeroton but is constrained by the available power supply. After engaging with City Power around the possibility of acquiring extra power capacity to run an additional machine, they were informed that this was not likely to be possible.

Thus the evidence suggests that there are opportunities for growth in Aeroton and in particular for the area to attract more labour-intensive manufacturing. This, however, is unlikely to happen in the current environment. Such firms will not be attracted to an area where there are frequent and unpredictable power outages and where it is extremely difficult to run an efficient shift pattern due to public transport constraints. In addition to this, it is unlikely that new firms could be accommodated in terms of the available power supply in the area. Improvements to electricity and public transport infrastructure would make a substantial difference to the area's ability to capitalise on its good locational qualities. It is particularly important for these issues to be resolved in Aeroton because of the number of manufacturing firms in that industrial district. Manufacturing tends to be labour intensive, has multiplier effects and remains critical to growth in South Africa as a source of demand for other sectors thus playing an important role in pulling along growth.

The agglomeration in industrial districts and industrial clusters generally has 3 sources of benefits; linkages between intermediate and final goods, labour market interactions and knowledge spill overs (Manchester Innovation Investment Fund, 2008). This is important to firms as it is a way of reducing transportations costs, where transportation costs are interpreted widely to include difficulties in exchanging goods, people and ideas (Glaeser, 2007). Aeroton has the potential to be an attractive industrial district for firms that wish to benefit from agglomeration. As mentioned previously it has easy access to the highways, close to a source of labour and has relatively inexpensive rentals. However, the challenges related to basic municipal services that are critical for continuous production processes make Aeroton less attractive. Addressing these issues will not only improve the efficiencies and consequently competitiveness of existing firms in Aeroton but would also attract more firms.

5.2 Industria West

The firms interviewed in Industria West were also engaged in a variety of different activities. These were: steel rolling; import and distribution of metals; newspaper distribution; manufacture of foam furniture; manufacture of office furniture; manufacture of electrical equipment; wholesale and retail of electrical equipment and distribution of forklifts.

The same set of interview themes were used as in Aeroton. Most of the firms interviewed had less than 50 employees with the exception of 1 with 51-200 employees and most of the firms interviewed have been in Industria West for 6 to 10 years with one having been there less than 5 years another for more than 10 and one for over 31 years. Many of the firms interviewed

were not engaged in manufacturing so the issue of capacity was not relevant to them. However, of those for whom capacity utilisation is an appropriate measure, one stated that it was operating only at 61 – 70% of capacity and two were operating at close to 100% of capacity. In terms of turnover, the smallest of the interviewed firms less than R10 million a year and the largest makes between R101 million and R500 million.

5.2.1 Performance, competitiveness and market conditions

Some of the firms interviewed were experiencing challenging operating conditions with depressed levels of demand from domestic customers. The area was affected by the recent metalworkers strike, mainly in terms of difficulties in getting hold of inputs from suppliers whose workforces were on strike. Similar to the experience of firms in Aeroton, firms seem to have mainly experienced a slowdown in demand from domestic customers, while demand in the region is still strong. Some firms explained that they have therefore attempted to grow their business in the region in order to mitigate the effects of the slowdown in South Africa.

One South African firm which manufactures low-end mattresses and other furniture noted that it is losing ground to low cost competitors which are able to manufacture their own inputs (foam). The firm had lost 50% of its KZN business to Chinese competitors, and now low cost manufacturers have moved into Gauteng and are eroding that business too. The firm claims that these low cost competitors are able to produce very cheaply by avoiding compliance with rules and regulations, and by paying very low wages to workers.

However, 4 of the firms also reported strong growth of more than 5% per year. Most of these firms are relatively young and dynamic with one established firm. One firm explained that its strong growth was due to supplying niche products which are in high demand from foundries and car manufacturers. It also suggested that its small size and efficiencies achieved as a result have helped it to be successful in the market. The other firm explained its success as due to experience in the industry and the focus of management on the business. This firm has recently expanded its plant as a result of growing demand. The established firm experienced growth greater than 10% in the past three years and the growth was achieved through improved capacity output. 3 of the 4 firms that have been grown are also exporting to neighbouring countries.

5.2.2 Crime and security

All the firms interviewed noted that crime is a particular problem in the area, and this seems to be more of an issue in Industria West than in Aeroton where few firms mentioned security concerns. The types of incidents mentioned were hijackings, break-ins, muggings and robberies and one interviewee had a family member who was shot and killed in a robbery in the area. Firms who operate round the clock noted this as a particular problem, as it is not safe for workers to walk through the area after dark. This has resulted in one firm being forced to provide transport to its employees because of safety concerns. Interviewees reported very little police presence in the area even though the nearest police station is in Langlaagte which is not too far away.

This imposes a cost on businesses as well as being unsafe for their employees who have to travel to and from work in the area. Firms have to invest in expensive private security measures and transport in order to keep employees safe. They also suffer theft and shrinkage which imposes a further direct cost on the business. The lack of security also makes Industria West less attractive to new businesses and to potential customers who might visit firms for meetings or to purchase products and services. There are a few retail and wholesale firms and distributors in the area who are most affected by this.

At first glance, the survey results do not seem to be consistent with the outcomes of the interviews as the survey results show that crime is more of an issue in Aeroton than in Industria West. However, some of the larger firms interviewed in Aeroton had indicated that crime used to be a big problem but over time this has been reduced. The respondents may have been referring to incidents in the past.

5.2.3 Public Infrastructure

5.2.3.1 Electricity

Firms generally cited an adequate electricity supply in Industria West, and all agreed that power outages are not a major problem in the area. This is quite a different story to Aeroton where firms find outages to be the biggest challenge to their business. In Industria West, even manufacturing firms did not report struggling with power outages.

However, two firms indicated that the challenge that has the greatest impact on their businesses is power interruptions. Both of these firms are manufacturers producing water meters and the office furniture. Another firm also noted that the power supply in the area is highly volatile, with constant voltage surges and dips. This is mainly problematic for electronic equipment firms whose products are sensitive to such fluctuations. The firm in question estimated that these surges and dips had cost the business R20 000 so far this year. Furthermore, when there are outages, most firms reported that this is extremely disruptive. Only one firm reported having a generator in place.

High electricity costs were mentioned by several firms as a major challenge for their businesses. One firm noted that it has had to absorb the increases in the electricity price as in the current environment it is not possible to pass the cost increases on to customers. Another firm noted that although it is not particularly electricity-intensive, the increases have been challenging for the business. The same firm also noted that its electricity bill is much higher in winter, even though it does not use more electricity in winter than in summer. Another firm indicated that City Power adds a 25% surcharge on their electricity bill in winter due to the general increase in electricity demand at this time of the year. One of the manufacturing firms noted that the manufacturing firms should not be subject to this increase as power is an essential component in production. The surcharge adds to the already high electricity bill.

The interviews suggest that either Industria West experiences less power outages than Aeroton or that the firms in Aeroton are more sensitive to the power outages given the nature of their business. The later argument is supported by the complaints about power outages from the manufacturing firms that were interviewed.

5.2.3.2 Public transport

As noted above, Industria West is well served with public transport options, with easy access to Rea Vaya, Metrorail and Metrobus services, as well as minibus taxis. The majority of employees seem to travel from Soweto to Industria, although a substantial group also come from Orange Farm. The only difficulty reported by firms is similar to the challenge experienced in Aeroton which is that public transport does not run after hours. This means that firms cannot easily run overtime or shifts which end or start after normal working hours or on weekends. Once again, firms have had to solve this problem by providing transport to their employees, at their own cost.

In terms of the various transport options available, firms described the costs and benefits of each. The relative price of the different forms of transport from Soweto to Industria West are

listed in the table below. Taxis and the bus are the most expensive means of travelling from Soweto to Industria West at over R16 per day. Those interviewed noted that the train is the cheapest option by far and therefore many people use it even though it is very crowded and unsafe, with muggings commonplace. The train stations are also reportedly dirty and unsafe. Only a few firms reported that their employees use the Rea Vaya and it was generally believed to be too expensive for most people. One firm noted that employees find that the Rea Vaya bus drivers drive recklessly and cited this as another reason why employees do not use the service.

Table 11: Cost per day of transport from Soweto to Industria West and back

Form of transport	Cost per day
Train	R6/7
Rea Vaya	R14-16
Taxis	R18
Bus	R16+

Source: interviews with firms in Industria West

In general, the most commonly used form of transport is the train, which is cheap and convenient for employees but overcrowded and dangerous. No public transport options exist after hours.

5.2.3.3 Other infrastructure and services

Another commonly cited problem in the area is with littering and lack of refuse removal. All those interviewed noted that the area is dirty and littering is a problem. Several firms also complained that refuse removal is not regular and that this is unhygienic and attracts vermin. Stormwater drainage appears to also be a problem in some parts of Industria West and interviewees explained that when there is heavy rain, water overflows into the streets. This is consistent with the City of Johannesburg's assessment of the status of infrastructure in the area.⁶ The node profile indicates that the road network needs to be upgraded and that there is a need to upgrade the electricity and storm water systems in the area. The assessment continues to say that there is adequate coverage of bulk sewer but some outfall sewers have insufficient capacity.

Though the node profile is in a document dated November 2010, the interview suggest that firms are still experiencing the same problems.

These problems influence the appearance of the area, making it less attractive to firms, employees and customers. Once again, this is most problematic for the retail/wholesale and distribution firms whose customers visit the premises. There is also a lack of amenities such as cafes and shops in the area which again influences its attractiveness to potential customers.

5.2.3.4 Skills and training

Firms in Industria West did not generally report severe difficulty in finding and employing adequately skilled staff. Similar to the firms in Aeroton, however, most firms reported their main way of obtaining skilled staff is to hire people without experience and train them in-house.

⁶ http://www.joburg-archive.co.za/2010/pdfs/sdf/final/annc_industria.pdf

One firm noted that it needs employees to have an amount of industry experience and hence it usually is forced to poach people from its competitors. Several manufacturing firms stated that there is no external training programme which is tailored to their needs and so it is easier to train people on the job. One small firm explained that it would like to send employees to external training programmes, for example in machine operation and maintenance, however, it does not have sufficient funding available for this. Two firms noted the need to bring back apprenticeships. The shortage of artisans in the country poses a challenge to industry and in the past the apprenticeship programmes produced these artisans. The firms noted that it is less important for potential employees to have certificates and more important that they have some practical training. The firms further noted that the FET colleges have not been successful in producing graduates with practical skills. One of these firms uses a private service provider located in Pretoria to train staff. This poses additional challenges as the firm must transport the employees to and from Pretoria to attend classes.

5.2.4 Technology, investment and research and development

Most firms did not report having made investments in the last two years, mainly as a result of the poor economic conditions. One firm noted that they had considered investing in a new piece of machinery but had decided against it in the current conditions. One small manufacturing firm was interested in upgrading its machinery in order to be more efficient and reduce the time lost to break downs due to old machinery which they estimate to result in around 8 hours of downtime per week. The firm has had to train employees to conduct basic machine maintenance in order to deal with this problem. In order to make this investment the firm approached both DTI and SEDA for assistance but was not successful in accessing any grants or incentives. The process was described as extremely opaque and difficult to navigate and it was very difficult to get information on the relevant programmes and how to access them.

However, we note that this experience is not common to all the firms that were interviewed. Another relatively new firm entered the market for the production of office furniture using second hand machinery. The firm then applied for the Department of Trade and Industry's Manufacturing Competitiveness Enhancement Programme (MCEP) grant to update its machinery. Though the process took some time, 8 months, the firm received the grant and is currently upgrading their plant. The most obvious difference between the firm's approaches is that the one used consultants to apply for the grant while the other made the application internally. This is not to say that is the only difference between the circumstances of the firms but a previous study reviewing the take up of government incentives concluded that a firm was more likely to access grants and incentives if a consultant was used. This immediately places a bias in the types of firms that can have access to incentives as the bigger firms would be able to hire consultants while smaller firms may not be in the same position. The City may consider having people that can assist firms to access both City and other government agency grants.

5.2.5 Competing with informal businesses

One small firm explained that it is hard to compete with firms who do not comply with labour and buildings regulations. The firm pays UIF, complies with building regulations and its workers are unionised and covered by the industry bargaining council. In this environment it has to compete with locally based competitors who do not have these costs because compliance with the different regulations is not effectively enforced. The firm manufactures low end furniture for domestic use and therefore is very vulnerable to low cost competition.

5.2.6 Opportunities for growth of Industria West

Industria West has a good location with easy access for employees and customers and in general firms seem to like the area which is well established for industrial uses. The plots are large and there is some room for expansion in that there are some undeveloped or vacant plots. There are some very simple interventions which could drastically improve the attractiveness of the area to new businesses and customers alike. If the City could reduce the level of crime in the area and neaten up the surroundings, this would make an immediate difference to the area.

One firm interviewed suggested that the area could be further enhanced if the City could use reclaimed land from mine dumps to attract new businesses to the area. The City could offer cheap power to firms investing in the area and build good roads to link it to the rest of the province. With the right incentives and infrastructure this could turn into a high-end business park that would revitalise the area and attract new, cleaner, high-tech industries

5.3 Wynberg

The five firms that were interviewed in Wynberg engage in manufacture of chemicals and chemical products, transport and storage, manufacture of basic metals, manufacture of machinery and equipment, and manufacture of furniture and jewellery. The firms interviewed had employees ranging from 20 employees to 260 employees and have been located in Wynberg for an average of 20 years. However, it is important to note that 5 firms are not sufficient to generalise the experience of all the firms in Wynberg and there is need for further work in this area.

The firms informed us of the existence of an area industry association called the Wynberg Improvement District which has assisted in fighting crime and the establishment of a clean and safe environment for all stakeholders. Wynberg Improvement District has been in existence since 2006.

There may be some form self-selection bias in the firms. Manufacturing firms were more willing to take part in the in-depth interviews. This may not paint an accurate picture of what other firms in Wynberg are experiencing, and therefore there is need for a follow up survey.

5.3.1 Performance, competitiveness and market conditions

The firms interviewed in Wynberg reported that they are doing well despite the challenging environment that they experienced in the past couple of years. The improvement in company performance is largely owed to firms increasing their customer base through exporting their products to other countries in African, Europe, middle-East and South America as well as carving out niche markets.

One of the firms that was interviewed indicated that it has become more competitive than its rivals in order to attract more customers not only in South Africa, but in Southern Africa. This has been facilitated by offering 24-hour call-out services and increasing their carrying out advertising campaigns. Despite these efforts, they are still losing some of their customers to Chinese competitors that offer what they deem as inferior products at lower prices.

Of the five companies that were interviewed, the chemical manufacturer reported that they have increased their sales by approximately 400% over the past 3 years. This firm indicated that they involved from product development to the sale and application of the product for the end user. This company has managed to stay competitive through the development of a specialised chemical product. This firm also reported that they are operating at 80% capacity.

There is another firm in the manufacture of basic metals which has also been performing well. This is evidenced by the reported increase in their sales and occupying more land. They have even expanded their plant size by more than 100%. This firm has the largest space in Wynberg and imports to countries in Southern Africa, middle-East and Europe.

5.3.2 Public Infrastructure

5.3.2.1 Electricity

Electricity supply is a major concern that was highlighted by four out of the five firms that were interviewed, interestingly one firm reported that they had not experienced power interruptions in the past year. All the firms reported that they do not receive warning pre-empting the power outages. The firms that were interviewed noted that they experience on average at least 6 power outages per year which usually last from a few minutes to several hours. In order to rectify this issue the firms have resorted to installing generators. Generators are a substantial investment which increases operating expenses for firms and diverts resources from investment and future expansion plans.

Power outages disrupts production for a number of reasons. For example some of the equipment that is used in the production process are too heavy to be powered by generators. As such firms end up completely halting operations. In other instances, unexpected power outages result in the damaging of compressors and machines. If the power outages did occur at scheduled times, firms would be able to power down their machines properly, inform their customers of the likely delay in delivery and cater for unplanned losses in production. The firms reported that if they are warned of the power outages, they usually do not occur at the prescribed time, which defeats the purpose of warnings.

5.3.2.2 Public transport

There is one firm that reported that it had considered running shifts in order to increase its productivity but had failed to do so due to the unavailability of public transport at night and early in the morning. The lack of transport availability during the night and in the morning may also deter other firms from operating night shifts. Furthermore, there have been a number of cases that have been reported of crime and theft, and transport availability at these times is imperative.

Most of the firms that were interviewed noted that they do not operate shifts and do not deem public transport as a major concern. The majority of employees that work at the firms that were interviewed live in Alexandra Park and their public transport seems to not be a major concern since it is within walking distance from Wynberg. In addition there are PUTCO buses and mini bus taxis that the employees have access to as a source of transportation.

The proximity of the firms to Alexandra Park implies that it is a large source of labour. The firms can benefit from more efficient transport systems connecting the two places since they are about 2km apart. The firm that operates the 24-hour business noted that they provide company transport for the call-out services.

5.3.2.3 Other infrastructure and services

Water

One firm reported major distress that has stemmed from the erratic water supply. They manufacture chemical products that are water-based and as such water is a vital component of their production. This firm reported that water interruptions have been extremely severe with the disruptions lasting from several hours to a day without pre-warning. After enquiring with

the City, they were informed that the water interruptions were due to maintenance or a burst water pipe and that they were required by law to own a *Jojo* tank.

In order to mitigate the effects of the water interruptions the firm installed a *Jojo* tank that holds up to 10 000 tonnes of water. Nevertheless, the *Jojo* tank cannot meet all their needs due to its capped capacity. Such water interruptions have direct and indirect impacts on the production including remunerating employees for no production and delayed targets.

The rest of the interviewees in Wynberg noted that water is not a major concern as they indicated that water interruptions are likely to affect water for their ablution facilities and human consumption. One firm noted that they once received warning of an up-coming water cut which did not occur, but conversely when they were not warned there were water cuts. Furthermore they experienced irregular water pressures which affected their manufacturing process. This has since been rectified.

Roads

One of the firms noted water interruptions are usually associated with road works. One firm reported that a burst water pipe on Grayston Drive resulted in road closures for a couple of weeks due to the delayed efforts to repair the water pipes. The firms noted that road construction occurs for prolonged periods as firms noted that the City digs up holes and leaves them without refilling. One of the firms noted that the firms (or property owners) have resorted to repairing the roads within their vicinity at their own expense. Clearly this is another unnecessary expenditure which shifts resources from efficiency enhancing investments.

Crime

The firms noted that the lack of police presence in Wynberg has resulted in them feeling unsafe. This sentiment was echoed by other firms who reported that security may be an issue as there have been cases reported of “smash and grab” and hijacking. This reiterates the need for transport during the night and early morning so that if there are shift operations, employees can travel to and from work safely. One of the firms noted that there is a new security company that surveillances parts of the area 24/7. The security company has been linked to the Wynberg Improvement District.

The poor status of infrastructure and high rentals have resulted in two of the firms interviewed considering relocating out of Wynberg.

Strikes

The NUMSA strikes have affected four out of five firms surveyed as they use metal inputs during production. One of the firms that manufactures air conditioning units noted that the strikes occurred during winter when their demand was low. This enabled them to stock their inputs ahead of the strikes. Another firm that manufactures metal products noted that they had to close down for a month, and this had detrimental effects on the business.

5.3.3 Technology, investment and research and development

The firms reported that they have invested to meet the increase in demand and to improve quality and productivity. One of the smaller businesses noted that they have invested about R2 million to purchase equipment aimed at lowering costs, quality improvement and enhancing productivity. However, such investment has resulted in the elimination of unskilled employees as the machine carries out the same function as the employees were performing previously.

Two of the firms also mentioned that they have invested in increasing their plant size through renting more land so that they can accommodate the increase in demand. However their land expansion has been restricted by the expensive rentals.

Two of the firms noted that they have research and development departments where they have their own technology to manufacture their products. Furthermore they conduct their own product testing in-house.

5.3.4 Skills and training

Lack of appropriate skills is an issue that resonates across all the areas and firms that were interviewed. The firms in Wynberg noted that they struggle to hire skilled artisans and technical staff such as welders and fitters and turners. As such they undertake their own on-the-job training. One firm noted that the government used to have training facilities for artisans and technical skills, but have since closed them down. When they advertise for such positions more mature citizens respond to the adverts who possess the required skills that they have attained over time, with the younger citizens being less equipped. This raises a concern as this signals that the pool of available skills is dwindling.

Two of the firms indicated that even though they do not struggle to hire employees they offer some form of off-site training to their employees. Training courses include health and safety training; hygiene and housekeeping training; first aid and book keeping. The firms raised the lack of specialised training as a concern in terms of machine operation.

The firms did indicate that their labour turnover is low, as they retain the employees that they have employed.

5.3.5 Area Industry Association

There is an area association called Wynberg Improvement District (WID), which falls under Urban Genesis and specialises in consulting, urban management and place management services. Three out of the five firms interviewed reported that they are members of the WID, with the other two firms indicating that they are aware of their existence, but not members. The WID mainly deals with property owners and not with tenants. It is a Not-for-Profit Organisation which is mandated to address the appropriate use of land; upkeep of the area; safety and security and any other issue around infrastructure that their members raise. The members pay a monthly subscription levy.

The WID interacts with the City at an operational level and monitors the overall operation of the firms including water and electricity issues. Urban Genesis has a software to track all the infrastructure upgrades and breakdowns in Wynberg. The WID noted that the City does not respond to water, road and power interruptions quickly, and they assist in hastening the process for their members.

The WID identified some of the issues that firms in Wynberg are likely to face. The design of the road infrastructure is poor as there are narrow roads that do not accommodate any expansion plans such as parking, even though it is nested by main roads. This has resulted in the conversion of roads to one-way, in order to make provision for public transport. There are road works that are underway to erect a Rea Vaya bus route joining Sandton and Wynberg.

The other concern is safety and security in the area. As such they have commissioned a Crime Prevention team that patrols the streets during the day and at night. The radius that the team patrols is not quite clear, as they are supposed to prioritise the safety of their members.

The role played by the WID was reported by the three firms that are members. They noted that when they have an issue around water and electricity, WID seems more informative than the City. In addition, the Crime Prevention team has increased the safety environment in Wynberg to some extent.

5.3.5.1 Opportunities for growth of Wynberg

The interviews revealed that Wynberg is a favourable location because of the closeness to the highways and access to labour. It is also located in passage ways to Sandton, Pretoria, the East Rand and West Rand which enables access to their national markets easier. The WID reported that this is a mature area, and any City intervention should be aimed at retaining the business that is present in Wynberg. There is evidence from the interviews that suggests that there is available land for expansion since one firm recently doubled its plant size.

There are a couple of firms that were considering relocating due to the poor and unreliable infrastructure. Furthermore the high rentals deterred firms from expanding as they would have wanted to.

6 Recommendations and way forward

The firm survey and interviews generated a wide range of recommendations for the City in terms of potential interventions to make Aeroton and Industria West more vibrant and attractive to firms and to assist firms to improve competitiveness. Most of the recommendations are cross-cutting, but some are more or less applicable to Aeroton or Industria West.

The recommendations can be broadly split into two main categories.

First there are a set of area-based recommendations which work towards removing the bottlenecks which are affecting firm competitiveness and setting up the enabling conditions for firms to grow and for the areas to become vibrant, modern, successful industrial nodes. These recommendations are mainly aimed at addressing the infrastructure challenges faced by firms in specific areas and solving existing problems. Key areas for possible intervention based on the research into Aeroton and Industria West (and to a lesser extent Wynberg) include upgrading and maintaining electricity infrastructure, increasing the availability of public transport, assisting firms to provide useful skills and training, improving safety and security and upgrading the business environment through more regular street cleaning and other initiatives. There is also a very important coordination role for the City with regard to tackling the above-mentioned challenges, where the City can act as a catalyst by engaging with firms to find common solutions to their shared problems. In this way, the City can ensure that economies of agglomeration are realised for each industrial node.

The second set of recommendations build on this to think about how the City can go further in terms of taking a more active role in helping firms to identify and take advantage of new opportunities for growth and expansion. This involves understanding what strengths exist in Johannesburg, patterns of existing industrial activity and where there are opportunities to grow different industries. This set of interventions is more sector-based and forward-looking. We recommend focusing on clusters of firms where champions can be identified for particular initiatives. The most important industrial sectors in Aeroton and Industria West are food products, machinery & equipment, furniture and chemicals. Cluster based interventions in these sectors can make a substantial contribution to improving performance. Key potential interventions include coordinating export promotion for firms into fast-growing regional markets, assisting them in understanding and applying for incentives and assistance offered by government, setting up joint facilities for research and testing and collectively tackling sector-specific skills constraints.

The sections which follow discuss the two sets of recommendations in more detail before concluding on the possible way forward for the City in terms of interventions and further research.

Removing bottlenecks

Upgrade and maintain electricity infrastructure

First and most importantly the City should prioritise the upgrading and maintenance of the electricity infrastructure in industrial areas, particularly in Aeroton, in order to minimise outages and power surges in future. This is an issue which is likely to be relevant to most industrial

areas in the City, since industrial activities and manufacturing in particular are very dependent on a reliable power supply in order to be competitive.

Where power interruptions are unavoidable due to necessary maintenance, the date and time should be communicated to firms, ideally more than 24 hours in advance (but the earlier the better) so that they can plan around the outage. Once warning of an outage has been given, the City should do everything in its power to ensure that the outage occurs at the time specified and not at a different, unexpected time. Through engaging with firms in each area, the City can try to better manage outages through understanding the impact on firms and how this impact can be minimised.

Consideration should also be given to planning for the future expansion of industrial areas, in order to ensure that firms who want to expand can access sufficient power for the expansion.

The cost of power was also a serious concern for firms, however, this issue is less likely to be within the City's control.

Improve accessibility of public transport especially after hours

Similarly, public transport is likely to be a cross-cutting issue and an important issue for labour intensive firms, particularly those involved in continuous production. In the daytime, the public transport infrastructure in Industria West and Wynberg appears to be adequate, notwithstanding some difficulties such as with safety at the local train stations. However, it is clear from the interviews in Aeroton that the existing public transport infrastructure does not meet the needs of firms or commuters.

In all three areas, public transport after hours is non-existent. This results in real costs to firms in terms of reducing their ability to optimise shift patterns and obliging them to provide transport for workers themselves. There is also a cost to employees as they spend longer travelling to and from work and face safety concerns during the journey. It is inefficient for each firm in the area to plan its staff transport arrangements in isolation, particularly given that a large proportion of the workforce appears to be travelling to and from the same areas. This is a clear area for intervention by the City to solve the externality associated with the lack of coordination across firms.

One way for the City to tackle this problem would be to conduct more in-depth research in industrial areas to understand commuting patterns in much more detail. This could be done through engaging with the firms in the area and their employees and either asking them about their needs or actually tracking their commuting patterns. This would enable the City to design a solution to suit people's needs, either through providing public transport, or at least coordinating the efforts of firms such that a solution is developed for the area as a whole rather than on a firm-by-firm basis.

Assist firms to provide useful skills and training

Another challenge which is common to most firms is the difficulty in finding suitably skilled staff in key areas. This appears to be a particular problem for manufacturing firms, where people such as plant managers and experienced machine operators seem to be hard to find. Most firms resort to hiring inexperienced people and providing them with training. While some skills are specific to each firm, particularly if the firm operates in a niche area, there are also some

cross-cutting skills which are common to most firms. For example basic training in safety and risk management as well as basic science, electronics and machine operating may be required by employees of many firms in the area. Once again there is a coordination failure inherent in the way that firms deal with these shortages as each individually provides the necessary training to employees whereas it would be cheaper and more efficient to coordinate training in these common areas.

The City could therefore consider an intervention to encourage and possibly fund the coordination of basic training across companies. Once again, this would require engagement with the firms in the areas in order to better understand their needs and capabilities. Then training could be provided either through working with local FET colleges to design more appropriate syllabuses that meet firms' needs, or through a separate initiative for an industrial node or a group of nodes in close proximity. For example it may be possible for some of the larger firms to provide the facilities and even the syllabus and materials for training, with a financial contribution from the City to benefit all the firms in the area.

Improve safety and security in industrial areas

Crime appears to be a particular problem in Industria West, although it was also mentioned by respondents in Aeroton. One way in which safety and security could be improved which was suggested in the interviews is to increase the visibility of policing in the area, both during the day and at night. The nearest police station is not far from Industria West and the City should engage with the police in order to understand the feasibility of increasing patrols in the area. This would act as a deterrent to any criminal activity. Increased CCTV infrastructure in the area may also deter criminals. Particular attention should be given to the train stations and the areas around them where commuters pass through.

In addition, the City could encourage firms in the area to take a more pro-active approach to the security issue, perhaps facilitated through an area industry association. Firms could then coordinate their security activities in order to make them more effective. For example, one private security firm could be appointed for the whole area, making it easier to keep track of incidents. Through this mechanism firms could also share experiences, problems and solutions. This is the approach which has been taken in Wynberg, and those interviewed reported that incidents have since decreased due to the gating of the roads by the WID Crime Prevention team.

Upgrade the business environment

The City should conduct regular street cleaning and refuse removal in order to improve hygiene and upgrade the general business environment. Once again, this is an issue which was highlighted mostly in Industria West, but which was also touched on in Aeroton. This would assist firms in providing a professional environment for their clients and in particular may help retail and wholesale firms to attract more business. A further suggestion made by one firm was that recycling bins could be provided on each stand to assist with removing offcuts and other materials. This would assist in cleaning up the area and would also reduce the amount of waste in the area.

The firms in Wynberg stated that continuous road works are problematic. Scheduled and efficient construction and rehabilitation of roads would help make the area attractive and retain businesses. Secure parking spots are also an important aspect that attracts customers to an

area. The parking in Wynberg is unsafe as customers are forced to park their cars on the side of the road. Erecting parking lots is a costly exercise, and the City can in the meantime assist with ensuring that the area is safe.

Ensure a consistent water supply

Consistent water supply is a public service that should be available at all times. Water is important for the functioning of ablution facilities, consumption and more importantly production. Water pressure was highlighted as a challenge in Aeroton and the availability of water supply was reported to be problematic in Wynberg where one firm noted that water supply is a huge issue and heavily disrupts production. The City can engage further in order to understand the impact of the water interruptions in these areas, so that they can implement necessary measures to maintain water supply.

Facilitate coordination to achieve agglomeration economies in industrial nodes

As has been described above, most of the challenges that firms are facing are issues which could be addressed more efficiently through coordination, but at present firms are doing their best to resolve them independently. This means that the benefits of agglomeration that derive from being located in an industrial node are not being realised, and there is duplication of effort to resolve challenges in almost all areas. At present, there are few advantages to firms to being located in Aeroton or Industria West, aside from those which are a product of pure location (e.g. access to highways). Ideally what the City needs to work towards is providing an environment where firms can reap the benefits of the concentration of industrial activity in terms of shared solutions to common problems which lower firms' costs and allow them to be more competitive. The City is in a unique position to fulfil this coordination role and to catalyse the achievement of agglomeration economies in industrial nodes.

In Aeroton and Industria West, the first step would be to establish an area industry association with which the city could engage in order to understand the challenges that firms are facing and interventions which can effectively address these challenges. From the interviews it is clear that firms would welcome the opportunity for constructive engagement with the City around the development of the area.

Creating a forum for engagement with and between firms would enable the City to:

- Communicate directly with firms about issues that affect them and open a dialogue to better understand how their challenges can be addressed.
- Better understand the nature of the crime problem and its impact on firms and find ways to work with firms to improve safety and security in the area.
- Engage around firms' public transport needs and facilitate more efficient coordinated solutions, particularly to the after-hours problem. It would be useful for the City to understand which existing means of transport are being used and why, as well as how affordable the different options are for commuters.
- Help to coordinate and possibly fund training programmes which would be of benefit to firms in the area.

- Inform firms about programmes and assistance which could be of use to them and assist them in making applications for funding.
- Assist firms (especially smaller firms) to better market themselves and find new customers.

In addition to all of this, such an intervention would provide firms with a point of contact with the City which would enable them to seek assistance from the relevant person or department when they have problems. This would go a long way towards improving the relationship between firms and the City and would foster a more constructive dialogue around the best way for the City to support industrial activity in Johannesburg.

Assisting firms to take advantage of new opportunities

It is our view that the City should first remove the bottlenecks preventing growth and concentrate on providing an enabling environment in which firms can thrive. Once this has been achieved, more thought should be given to shaping the future of Johannesburg's industrial nodes. The second set of recommendations therefore builds on the first and suggests interventions which involve a more pro-active approach by the City in fostering industrial development in specific sectors. It is clear from the research that, with a few exceptions, demand for industrial products is not growing in South Africa and is not likely to do so at least in the short to medium term. There is quite a different trend occurring in the rest of the Southern African region, however, where a number of countries are growing strongly and where demand as a result is also growing. Firms based in Johannesburg should be well-placed to capitalise on this expansion, given their advantages of location and sophistication, but appear to be doing so only to a limited degree. An obvious area of intervention by the City therefore, is to assist firms to diversify sales into the region and so become less dependent on the stagnating domestic market.

The research has shown that there are a number of sectors with a strong presence in Aeroton and Industria West which also happen to produce goods which are in demand in the region. In Aeroton there is a small cluster of food processing firms as well as a number of capital equipment firms. Both of these are areas which are in demand in the region as consumer demand grows (food products) and mining and construction activity expands (capital equipment). Capital equipment is also a strong sector in Industria West, as are chemicals and furniture manufacturing, both of which also have the potential to expand to satisfy regional demand. Thus it seems that in both nodes the key areas of manufacturing activity correspond to the types of products which should be seeing growing demand, but it seems that this opportunity is not being fully taken advantage of.

In this context, another possible area in which the City could assist firms is to coordinate export promotion efforts for the area. This would be especially useful for small firms with limited resources which cannot necessarily afford to market themselves individually. This would work best where there is a cluster of firms in the area serving common types of customers. For example, the firms providing products and services to mines could be grouped together and joint marketing materials produced to be sent to potential customers in the region or handed out at regional trade fairs. The firms in this area continue to invest in such efforts independently with limited assistance from government, which means that once again the cost to firms is greater than it could be if there was greater coordination in their activities. Ideally the City

should coordinate these activities for firms across the City, but this would require a similar understanding of the activities being undertaken across Johannesburg's industrial nodes.

Very few of the firms interviewed were aware of any incentives or assistance programmes which they would qualify for or how to apply for these. This suggests that the City could do a better job of raising awareness of existing city programmes amongst existing firms and potential new investors. The City could also engage with firms in order to inform them of any assistance available from provincial or national government, such as the DTI's manufacturing incentives for example. In designing assistance programmes, the City should engage with firms to understand what would make a real difference to their competitiveness. A suggestion arising from the interviews is that assistance to upgrade machinery and equipment may be useful, given that several firms noted that their plants are less efficient than they could be due to outdated machinery.

Another possible area of coordination by the City is in setting up joint facilities and support for research, product development and testing for specific sectors. Johannesburg is well-located in terms of access to skills and proximity to higher education institutions which could lead to fruitful partnerships with local further and higher education institutions. This would need to be investigated at a sector-specific level, however, as needs are likely to vary across sectors and even sub-sectors.

Way forward

We have proposed the key elements that can immediately be incorporated into the City's action plans which should have as its target removing the bottlenecks for firms in Aeroton and Industrial West. These bottlenecks include poor power infrastructure and public transport, where the key to solving these problems is ensuring that is coordination in finding solutions for issues faced by firms. This will establish private and public partnerships to create a conducive environment for firms to operate optimally and through firm growth achieve higher levels of employment.

The next step for the City is to design strategies for the identified opportunities for industrial nodes in Johannesburg. The research conducted on the pilot industrial nodes has revealed that there are some inaccuracies in the available information on characterisation of industrial nodes in Johannesburg. The City has industrial node profiles for all 28 nodes which characterise areas in terms of the nature of activity taking place, the status of public infrastructure, strategic opportunities in the area and node land size and land availability. The survey and firm interviews in Aeroton and Industria West have shown that the economic activity characterisation to be incorrect. For example the nodal profile indicates that Aeroton's primary activity is warehousing and distribution whereas we have found that 51% of firms in Aeroton are actually manufacturing. The survey results are in line with the relatively high gross value add that is recorded for the Industrial node. Aeroton is in the top 5 areas in Johannesburg, in terms of contribution of high value manufacturing gross value add.

This highlights the need to better understand the remaining industrial areas in Johannesburg in order to more precisely characterise the areas to inform interventions by the City to take up identified opportunities. The second category of recommendations (discussed above) focus on taking advantage of the opportunities that are open to Johannesburg as a city given its locational advantage for servicing the growth in demand in neighbouring countries. If the City

is to appropriately identify the sectors where it can encourage clustering and where such clusters should be located it is crucial to have a more complete understanding of the special distribution of firms within the city.

We propose that following the pilot studies, the next research that is required by the City is a scoping of the remaining 26 nodes where fieldworkers can be sent to the industrial areas to conduct a mini survey that would seek to understand firm activities, size in terms of employees and turnover and performance. This information will be used to identify patterns of activities across the City to assist with the design of sector clusters. We have found from the survey of Industria West and Aeroton that the more common economic activities are food processing, capital equipment manufacturing and to a lesser extent furniture manufacturing and chemicals.

We recommend that work starts on the clusters alongside extending the pilot studies. From the existing data on output and employment at the city level it is obvious that these sectors are large (aside perhaps from furniture, although this is more labour-intensive) and the trends analysis indicates that there is significant growth potential if there is improved competitiveness.

The scoping for the remaining industrial areas will be based on the Lightstone Business database which has contact information for firms in all the 28 industrial areas. The database will only be used as a starting point as a comparison of the Lightstone Business Database with the survey data showed that there are some firms not accounted for in the database. This could create some biases in the characterisation of industrial nodes, as such it is still necessary to conduct the scoping study. In Aeroton the database does not have information on some of the bigger manufacturing firms such as Polyoak, Sasko and Premier Food (Blue Ribbon). The omission of firms could lead to mischaracterisation of industrial nodes. Two of the firms omitted from the Aeroton database are involved in large scale food processing and all the firms are important for employment as they employ in excess of 500 employees.

Post City-wide scoping exercise, the city can roll out full (revised) survey to a City-wide sample. This will test the results of the firm survey in other nodes which may be different from the pilot areas. The results of this exercise will assist the City to prioritise, i.e. electricity is most problematic in certain nodes, whereas public transport may be more urgent in others.

The City could then repeat the firm survey annually in order to track firm performance over time and changes in nodes and assess the impact of City interventions.